

Historic, Archive Document

Do not assume content reflects current scientific knowledge, policies, or practices.



LIBRARY
RECEIVED
MAR 20 1923
U.S. DEPARTMENT OF AGRICULTURE

THE
QUEENSLAND AGRICULTURAL JOURNAL,

ISSUED BY DIRECTION OF

THE HON. THE SECRETARY FOR AGRICULTURE.

EDITED BY J. F. F. REID.

NEW SERIES.

VOLUME XVIII.

JULY TO DECEMBER, 1922.

BY AUTHORITY :
ANTHONY JAMES CUMMING, GOVERNMENT PRINTER, BRISBANE.

1923.

QUEENSLAND AGRICULTURAL JOURNAL.

VOL. XVIII. PARTS 1 TO 6

GENERAL INDEX.

	Page.
A.	
Abortion in Cattle, Contagious	183
Act, Primary Producers' Organisation	243
Act, Primary Producers' Pool	370
Advisory Board, Dairy	5
Agricultural College—	
Bursaries	127
Egg-laying Competition	58, 232, 294, 350, 401
Dairy Herd Milking Record	18, 117, 232, 294, 362, 399
Agricultural Council Activities	1, 65, 237, 253, 320, 335, 383
Agricultural Districts Rainfalls	125, 157, 276, 381, 409
Agricultural Education, Legislation, &c.	119, 321
Agricultural Industry Organisation, &c.	1, 65, 237, 253, 320, 335, 383
Agricultural Seeds, Purity and Germination	104
Agricultural Study	414
Airedale Terriers	57
Analysis for Farmers' Seeds, Free	190
Answers to Correspondents	57, 130, 328, 377, 418
Anthraxnose of the Vine (Black Spot)	264
Ants Attacking Sugar-cane, White	279
Ants, Destroying	127
Aphis, Peach	388
Apiculture Exhibits	230
Arrowroot Pool	367
Arsenic as a Cotton Pest Killer	127
Astronomical Data for Queensland	64, 138, 252, 334, 382, 426
Australian Sugar Producers' Association Exhibit	171
B.	
Bacon, Ham, and Lard Exhibits	219
Bacterial Diseases of Grubs	148
Banana—	
Beetle Borer	48, 279
Bunchy Top Disease Experiments	307
Bunchy Top or Choke Throat	368
Ripening in Airtight Chambers	109
Weevil Borer	191
Basic Slag Problems	100
Bee Culture Exhibit	230
Bee Eater	120
Beerburrum Fruit	120
Beetle Borer—	
Cane (Parasite)	278
Dried Apple	270
Fumigating Cane	393
Scolytidid	270
Birth of another Co-operative Enterprise (Egg Shipping)	353

	Page.
Blackhead in Turkeys	375
Blackleg	133
Black Spot of the Vine (Anthracnose) ...	264
Blowflies, Protection of Sheep from ...	102
Blowfly Pest	2
Boll Weevils and Overflows	124, 127
Boll Worm Menace	248
Boonah Rural School	176
Borer—	
Banana Beetle	48, 279
Banana Weevil	191
Cane Beetle (Parasite)	147, 278
Cane Moth	392
Cane Weevil, Tachinid (Parasite) ...	394
Cherry-wood	270
Botanical Division Exhibit	187
Breeding, Stock	30
Building up the Agricultural Industry ...	320
Bunchy Top Disease—	
Experiments	307
In Bananas	368
Or Choke Throat	369
Bursaries, Queensland Agricultural	
College	127
Butter and Cheese—	
Production	322
Show	24
Exhibits	202
Export Quality	27
Selling, Co-operative	247
C.	
<i>Calliphora augur</i>	274
<i>Campsomeris</i> Tasman, Digger Wasp	
Parasite	39, 231
Cane—	
Attacked by White Ants	279
Beetle Fumigants	393
Crop Prospects in Burnett	246
Grubs, Diseases, and Fumigation ...	148
Pest Combat and Control	32, 87, 146, 277, 392
Top Silage	329
Values Table	118
Canned Products, British Market ...	324
Carabeen Tree, Red	394
Case Moths	15
Cassava Growing and Manufacture ...	75
Cattle—	
Contagious Abortion	183
Exhibits, National Show	221
Certificates of Soundness, Stallions ...	60, 137, 236, 307, 373
Cheese and Butter Production	322
Cheese—	
Exhibits	206
Neglect, Dairy Industry	371
Show	24

	Page.
Chemotropism, Influence of, on <i>Lepido-</i> <i>derma Albo</i> . W.	307
Cherry-wood Borer	270
Chillagoe Orchard	92
Choke Throat or Bunchy Top in Bananas	368
<i>Chrysomya albiceps</i>	272
<i>Chrysomya Varipes</i>	273
Cleared Land Cultivation, Newly ...	420
Cockroaches Extermination	130
Coffee-growing in Queensland	7
Comment, Event and ... 120, 321, 367, 414	
Concerted Action and Compulsory Powers, a New Zealand View ...	322
Control and Combat of Cane Pest ... 32, 87, 146, 277, 392	
Co-operation— Amongst Poultrymen	325
And Common Honesty	324
In California	323
State-wide, Rural	1
Co-operative— Butter Selling	247
Enterprise, Birth of another (Egg Shipping to London)	353
Marketing	369
Correspondents, Answers to ... 57, 130, 328, 377, 418	
Cotton— Boll Worm	248
Consumption, Next Year's	124
Crop Outlook	123
Culture Director	417
Exhibits	171
Exports for 100 Years, U.S.A.	125
Federal Guarantee 120, 127, 248	
Pest Killer, Arsenic as a	127
Pest on Downs	414
Picker, Electro Mechanical	99
Price Conditions, Government Advance	357
Planter, Dont's for	371
Ratoon	415
Situation	122
Staple, American Prices	123
Yield Increase and Quality Improvement	8
Council of Agricultural Activities 1, 65, 237, 253, 335, 383	
Crow Trap	128
Cultivation of— Grape in Queensland ... 18, 109, 260	
Newly-cleared Lands	420
Cup Moths	270

D.

Dairy— Advisory Board	5
Cattle Exhibits	223
Herd Milking Records, Gatton College ... 18, 117, 232, 294, 362, 399	
Industry, Reported Neglect of Cheese	371
Dawson Valley Scheme Irrigation Bill	321
Departmental Court Exhibits	165
Dehydration	324
Digger-wasps Parasites 39, 394	
Dingo Pest	57
Director's Career, Queensland Pro- ducers' Association	72
Diseases— Experiment Station, Stock	182
Investigations, Plant	15
Poultry	182
<i>Dissilaria baloghioides</i> (Hauer Tree) ...	359
Downy Mildew of the Vine	265

E.

Eclipse— Solar	139
Solar, Jensen Theory	365
Edible Trees and Shrubs	187
Editorial Notes 119, 247, 320	
Education (Agricultural)	119
Egg Laying Competition, Gatton College 58, 232, 294, 350, 400	
Eggs— Setting	51
Shipping to London	353
Electro Mechanical Cotton-picker	99
Entomological and Related Exhibits ...	190
Event and Comment ... 120, 248, 321, 367, 414	
Exhibition (Royal National)	162-230
Experiment Station— Stock Diseases	182
Summary, Sugar 75, 151, 300	
Sugar Exhibit	165
Export Butter, Quality of	27

F.

Factors in an Ideal Ration	410
Fallow, Summer	29
Farm and Garden Notes ... 61, 136, 249, 331, 422	
Farm Exhibits	229
Fertiliser Experiments, Sugar Experi- ment Station	75
Fertiliser, Fowl Manure	577
Field Reports, Sugar ... 52, 81, 143, 289, 341, 389	
Fish Poison Vine	419
Fly (Blow) Pest	12
Fly (Blow) (Protection of Sheep)	102
Fly (Fruit) Investigations ... 15, 131, 269, 344, 387	
Fly (Maggot), Facts of Importance, <i>re</i> Sheep	272
Fodder Tree from North Queensland (a Native)	96
Folding Saw	57
Forest Lands and Scrubs of Queens- land	93
Forest Legislation and Education	128
Fruit— Australian, in England	122
Exhibits	230
Fly Investigations ... 15, 131, 269, 344, 387	
Standards and Packing	321
Fumigants for Cane Grubs (Soils)	148
Fumigating Cane Beetles	393
Fungus, &c. 15, 389	
Fungus Attacking <i>Campsomeris tas.</i> ...	231
Fusarium in the Tomato Plant in Queensland	10
Future of Sugar Industry	258

G.

Garden Notes, Farm and ... 61, 137, 249, 331, 378, 422	
Gatton Agricultural College Bursaries ...	127
Gatton Agricultural College Egg- laying Competition ... 58, 232, 294, 350, 400	
Gatton Agricultural College Milking Tests 18, 117, 232, 294, 362, 399	
General Notes 54, 127, 326, 374, 417	
Germination and Purity of Agricul- tural Seeds	104
Grain Weevil Investigations	15
Grape Culture in Queensland ... 18, 109, 260	
Grasses Exhibits	187

	Page.
Grasshopper Eggs	270
Grass Tree	377
Grub, Bacterial Disease and Fumiga- tion (Cane)	148
Grub Pest and Fumigation	87
Gumming Disease of Cane	217

H.

Ham, Lard, and Bacon Exhibits ...	219
Hauer Tree	359
Home Tanning	346, 402
Horses, Exhibits	220
Horticulture Notes	108
Human Machine on the Land ...	101, 158

I.

Improving Quality of Cotton and Yield Increase	8
Irrigation Bill, Dawson Valley Scheme	321
Ivory Wood Tree	45

J.

Jo Jo Weed	398
-------------------	-----

K.

Kudzu	365, 367
--------------	----------

L.

Lamb Raising	367-8
Lard, Bacon, and Ham Exhibits ...	219
Layers, Selection of Egg	50
Legislation, New Agricultural ...	119
<i>Lepidoderma Albohirtum</i> W. ...	307
Lice on Pigs	323
Lime Sulphur Wash	329
Lime, Use in Stanthorpe District ...	418
Lucerne (Tree)	329
<i>Lucilia</i> —	
<i>Caesar</i>	274
<i>Sericata</i>	273

M.

Magregor, R. L., his Career, Q.P.A.	
Director	72
Machine on the Land, Human ...	101, 158
<i>Macrosiagon (Emenadia) cucullata</i> ...	39
Maggot Flies, Sheep	272
Maize Seed for Sale	107
Mangosteen from North Queensland ...	34
Meat—	
Defrosting	121
Industry, Advisory Board	417
New Markets	121
Mechanical and Electrical Cotton Picker	99
Mildew of the Vine, Downy	265
Mildew of the Vine, Powdery	268
Milking Records, Gatton College ...	18, 117, 232, 294, 362, 399
Milking Tests, Exhibits	209
Mite, Red	133, 345
Moth Borer, Cane	392
Moth, Case	15
Moth, Cup	270
Motor Spirit Manufacture	127
Mouldy Rot or Pourridie of the Vine	268
Mouse Trap, A Useful	55

	Page.
Mulch for Pineapple Growing ...	7
Mulching of Pineapple (Paper) ...	292
Mustard or Oriental Rocket (Tumbling)	362
Mystery of Roaring Rails	117

N.

Nambour Rural Schools	36
National Utility Poultry Breeders' Association Competition	235, 256
Native Fodder Tree from North Queensland	96
<i>Neopollenia stygia</i>	274
New Staff Appointments	385
New Sugar Districts	291
North Australia Physiography ...	140, 297, 359

O.

Oidium or Powdery Mildew of Vine	265
Oil from Shale	151
Oil Leather or Shammy	54
One Farm Exhibit	200
<i>Ophyra nigra</i>	274
Orchard, A Chillagoe	92
Orchard Notes	62, 134, 250, 332, 379, 423,
Organisation of Agricultural Industry	1, 65, 237, 253, 335, 383
Oriental Rocket Weed	362
Overflows and Boll Weevils	124, 127

P.

Paper Mulch for Pineapple Growing	7
Paper Mulching of Pineapple	292
Para-dichlorobenzene Notes	393
Paralysis in Young Pigs	323
Parasite—	
Cane Beetle Borer	278
Cane Weevil Borer, Tachinid ...	394
Digger Wasps	39, 394
Factors Limiting Increase of Scoliids	394
Peach Aphis	388
<i>Pennantia Cunninghamii</i> Tree	159
Physiography of North Australia ...	140, 297, 339
Pig—	
Exhibits	227
Lice	328
Paralysis	328
Pigs that Pay	374
Pineapple Growing, Paper Mulch ...	7, 292
Plant Pathology	270
Poison, Rat	417
Poison Vine, Fish	419
Poisonous Plant Seeds	189
Pool Act—	
Primary Products	321, 370
Arrowroot	367, 417
Institution Procedure	369
Legislation Need	369
Wheat	417
Poultry—	
Breeders' National Utility Associa- tion Competition	235, 356
Co-operation	325
Diseases	183
Industry, Queensland	332
Selection of Egg Layers	50
Pourridie or Mouldy Rot of Vine ...	268
Powdery Mildew of Vine	265
Price of Cotton (Government Advance)	357
Primary Producers' Act	243
Primary Producers' Association, Director's Career	72

	Page.
Primary Producers' Activities 237, 253, 335, 383	383
Primary Producers' Organisation ...	119
Primary Producers' Pool Act ...	321, 371
Production, Prospects, and Prices 126, 372, 416	416
Protection of Sheep from Blowflies ...	102
Pruning of Vine ...	109, 260
Purity and Germination of Agricultural Seeds ...	104

Q.

Quality and Yield Increase Improvement of Cotton ...	8
Quality of Export Butter ...	27
Queensland Producers' Association, Director's Career 72, 237, 253, 325, 335, 383	383
Queensland Trees 45, 89, 159, 359, 394	394

R.

Rails, Roaring, Mystery of ...	117
Rainfall in Agricultural Districts 23, 125, 157, 276, 381, 409	409
Ration, Factors in an Ideal ...	410
Ratoon Cotton ...	415
Rats ...	277
Rat Poison ...	417
Red Carabeen ...	394
Red Mite ...	133, 345
Ripening Bananas in Airtight Chambers ...	109
Rocket Weed, Oriental ...	362
Rural Co-operation ...	1
Rural School, Boonah ...	176
Rural School, Nambour ...	56
Russian Wolf Trap ...	56

S.

<i>Sarcophaga</i> ...	274
Saw, Folding ...	57
Scale, San Jose ...	269
Science and Industry—Reports on Blowflies ...	12, 102
Science Notes ...	39, 231, 307
Scolytid Beetle ...	270
Scrub and Forest Lands of Queensland 93	93
Seeds—	
Free Analysis for Farmers ...	190
Better Crops, Better Commercial ...	189
Laboratory ...	189
Maize ...	107
Poisonous Plants ...	189
Purity and Germination ...	104
Setting Eggs ...	51
Shale Oil ...	151
Shammy or Oil Leather ...	54
Shanking of Vine ...	268
Sheep—	
Blowfly Protection ...	102
Exhibits ...	227
Maggot Flies ...	272
Small Flocks of, Value of Settlement ...	376
Show Dates ...	53, 130
Show, National ...	163, 250
Shrubs, Edible Trees and Silage, Green Cane Top ...	187
Slag Problems, Basic ...	329
Soil-fumigant for Cane Grubs ...	100
Soil-fumigant for Cane Grubs ...	148
Solar Eclipse ...	139
Solar Eclipse, Jensen Theory ...	365
<i>Soliva sessilis</i> Weed (Jo Jo) ...	398

	Page.
Some Notes on Fusarium in Tomato Plant in North Queensland ...	10
Spotted Wilt of Tomatoes ...	55
Stallions Soundness Certificates 60, 137, 236, 307, 373	307, 373
Standards and Packing (Fruit) ...	321
Standardised Canned Products ...	324
Stock—	
Breeding ...	30
Diseases, Experiment Station ...	182
Study of Agriculture ...	414
Sugar—	
Cane Attacked by White Ants ...	279
Districts, New ...	291
Estimates, 1922 ...	89
Exhibits ...	120
Experiment Stations Exhibits ...	165
Experiment Stations Reports 75, 151, 300	300
Field Reports 52, 81, 143, 289, 341, 389	389
Growing Districts of North Queensland ...	84
Industry, Future, Agreement Renewal ...	258
Producers' Association Court Exhibits ...	171
Sulphur and Lime Wash ...	329
Summer Fallow ...	29

T.

Table of Cane Values ...	118
Tachinid Parasite of Cane Weevil Borer ...	394
Tanning, Home ...	346, 402
Ticks Eradication ...	182
Tomato Plant, Fusarium in North Queensland ...	10
Tomato, Spotted Wilt of ...	55
Tree, Fodder ...	96
Trees and Shrubs, Edible ...	187
Trees, Grass ...	377
Tree, Lucerne ...	329
Trees, Queensland 45, 89, 159, 359, 394	394
Trees Suitable for Bell District ...	418
Tumbling Mustard Weed ...	362
Turkey's Blackhead Disease ...	375

V.

Vine—	
Diseases ...	263-8
Pruning ...	109, 260
Fish Poison ...	419

W.

Wasps' Parasites, Digger ...	39, 394
Weeds—	
Exhibits ...	189
Queensland ...	362, 398
Weevil Borer, Banana ...	191
Weevil Borer, Cane (Parasite) ...	394
Weevil, Grain ...	15
Wheat Pool Board ...	417
White Ants Attacks on Sugar-cane ...	279
Wilt of Tomatoes, Spotted ...	55
Wolf Trap, Russian ...	56
Wool Section Exhibits ...	17

Y.

Yeerongpilly Stock Diseases Experiment Station ...	182
--	-----

INDEX TO ILLUSTRATIONS.

	Page.		Page.
Agriculture and Stock Court (National Exhibition)	167	Entomological Panel, National Exhibition	191
Agriculture and Stock Staff	386	Equestrienne Teams Competition Winner	192
Amateur Lady Rider (Best) (Exhibition)	193	Exhibition Opening Ceremony	164
A.S.P.A. Display (Exhibition)	179	Experiment Station, Bundaberg, Sugar	155
Bacon Factory, Murarrie, Co-operative Display (Exhibition)	180	Experiment Station, Mackay, Sugar	85
Badila Cane, 15 months old, 55 tons per acre, W. Toates's Farm, N.Q.	327	Experiment Station, South Johnstone, Sugar	304
Banana Plant Butt Infested by <i>C. sordidus</i>	280	Farm, Winning Exhibit (One Man)	186
Banana Sucker, Infested	282-3	Fodder Tree, A Native	97
Bell de Kol Ongarrie, Friesian Bull, P. P. Falt	364	Folding Saw	58
Ben Arnold, 7 Years Champion Hack	194	Fruitgrowers' (Southern) Society Display	178
Best Amateur Lady Rider, Miss Spencer	193	Fuschia of Strathdhu, 1st Prize, I.M.S. Cow	313
Blacklands, Jean 5th of (A. Pickels)	316	Governor-General and President Interested in Jumping	181
Boonah Rural School Display	176	Governor, State, Congratulating Driver of Edna Wilkes on his Win	181
British Cotton Delegation at Government House	358	Graft Vine 19, 21, 22, 110-2, 114-6	
<i>Campsomeris tasmaniensis</i> and <i>C. radula</i> , with their Hyperparasites and Host Grubs	40	Grain Exhibit	175
Cane, 55 tons per acre, on W. Toates's Farm, N.Q., 15 months old Badila	327	Grand Parade, Royal National Exhibition	162
Cannery Display, State (National Exhibition)	173	Grape Pruning 19, 21-2, 110-2, 114-6	
Carabean Tree, Red	395-6	Grass, Sugar Cane, and Wheat Panels (Exhibition)	174
Cattle Exhibits	312-9, 364	Hack Champions	194
Champion Friesian Bull, Menelens of St. Albans (McLeod)	315	Hauer Tree	360-1
Champion Hack (Ben Arnold, 7 years)	194	How Stock and Scion are Cut for W.T. Graft of Vine	21
Champion Hack (Jack)	194	Hunt Winner, Miss Ward (Ladies)	193
Charms Duhalow of Oakvale (B. O'Connor)	318	I.M.S. Bull (Thor of Greyleigh)	312-3
Coconut Tree on J. D. Joyce's Plantation, Innisfail	310	I.M.S. Cow, 1st Prize Winner (Fuschia of Strathdhu)	313
Co-operative Bacon Factory Display (Murarrie)	180	Ivorywood Tree	46-7
Cotton Delegation at Government House, British	358	Jack, Champion Hack (Miss Mullen, Rider) A. D. McKay's	194
Cotton Ginning at Brisbane Exhibition	184	Jellicoe of Narinya (J. H. Fairfax)	517
Cotton Picker, Stukenborg Electric 99,	184	Jersey Judging	312
Cotton Trophy, National Exhibition (Central)	169	Jo Jo Weed	393
Cracow Station, Ministerial Visit	366	Journal Corner, Agricultural	166
Crows' Apple Tree	90-1	Joyce's, J. D., Plantation and Coconuts, Innisfail	310-1
Dairy Cattle	312-9, 364	Junior Classes at Play, Nambour Rural School	37
Dawson Valley Exhibits	186	Kudzu and Sweet Potatoes Feeding to Dorset Horn Lambs	397
Dawson Valley Garden, Ministerial Visit to Cracow Station	366	Larkspur (W. D. Carr)	319
Display of Club Swinging by Nambour Rural School	38	<i>Lepidoderma Albohirtum</i> W.	309
Display, Rural School, Boonah	176	Lorna of Arley	316
Dorset Horn Lambs Feeding on Kudzu and Sweet Potatoes	397	MacGregor, L. R., Director, Q.P.A.	254
Double-cleft Graft Vine	22	Mangosteen on Burdekin Delta, North Queensland	35
Downy Mildew of Vine Leaf	266	Margaret Anglin 2nd of Berry, Friesian, First Prize Winner (Hoskings)	314
Edna Wilkes's Driver Congratulated by Governor	181	Maud Rooker Korndyke (Brown's Friesian, First Prize Winner)	314
Egg Consignment Shipped by "Nupba" Co-operative Society to London	354	Menelens of St. Albans, Champion Friesian Bull (McLeod's)	315
Eggs for London	355	Mildew of the Vine, Downy	260
		Minister for Agriculture and Field and General Staff of Brisbane Office, Department of Agriculture and Stock	386

INDEX TO ILLUSTRATIONS—continued.

	Page.		Page.
Mouse Trap, A Useful	55	Rural School Display, Boonah	176
Murarrrie Bacon Co-operative Factory		Rural School Display, Nambour	37-8
Display, National Exhibition	180	Russian Wolf Trap	56
Mustard or Oriental Rocket Weed,		Saw, Folding	58
Tumbling	363	Seeds Bureau Display, Pure	168
Nambour Rural School Club Swinging		Single Cleft Graft	22
Display	38	Sovereign of Warden (F. O. Hayter)	317
Nambour Rural School Football Team	38	Stock and Scion Cutting for W.T.	
Nambour Rural School Junior Classes		Graft	21
at Play	37	Stock Institute Display	182
Navel Oranges Grown by C. Robins,		Sugar-cane Panel Exhibit	174
Miriam Vale	98	Sugar Court, A.S.P.A. Display	179
Oaklea Noreen	364	Sugar Experiment Station, Bundaberg	155
One-man Farm, Winning Exhibit	186	Sugar Experiment Station, Mackay	85
Opening Ceremony, Royal National		Sugar Experiment Station, South	
Exhibition	164	Johnstone	304
Oranges Grown by C. Robins, Navel	98	Stukenborg Electric Cotton Picker	99
Oriental Rocket	363	Thor of Greyleigh, I.M.S. Bull (Chase-	
Oxford Girl (E. Burton)	319	ling)	312-3
Oxford Golden Noble (E. Burton)	318	Tree, Hauer	360-1
Oxford Palatine Sultan (W. T.		Tree, Ivorywood	46-7
Conochie)	315	Tree, Native Fodder	97
Parade, National Exhibition	162	Tree, Papaw	92
Papaw Tree on Mr. Vautin's Orchard	92	Tumbling Mustard Weed or Oriental	
<i>Pennantia Cunninghamii</i> Tree	160-1	Rocket	363
Perfect Vine Cutting	19	Unusual Ration, Mrs. H. McMartin, of	
Pialba District Exhibit, First in "B"		Pullen Vale, Feeding Dorset Horn	
Grade	185	Lambs on Kudzu Leaves and Sweet	
Popular Prize Winner, A Blue Riband		Potatoes	397
"Walker"	188	Vine Graft 19, 21-2, 110-2, 114-6	
Prepared Stock and Scion with		Vine, Downy Mildew	266
Tongue Opened	21	Vine Cutting	19
Producers' Association, Director,		Walker, A Blue Riband	188
Queensland	254	Weed, Jo Jo	398
Producers' Association, Queensland,		Weed, Tumbling Mustard or Oriental	
Proposed Organisation Diagram	73	Rocket	363
Proper Scion for Cleft Graft	21	West Moreton District Exhibit, First	
Pruning, Grape 19, 21-2, 110-2, 114-6		in "A" Grade	185
Pure Seeds Bureau Display, Court of,		Wheat Classification Exhibit	189
Agriculture and Stock Department	168	Wheat Dump, 14,000 bags of f.a.q.,	
Queensland Producers' Association		Allora	311
Director	254	Wheat Panels, National Exhibition	174
<i>Radula (C.)</i> and <i>Campsomeris tas.</i>		Winner Ladies' Hunt, Miss Ward	193
Host Grubs and Hyperparasites	40	Winning Exhibit—One-man Farm	
Red Carabeen	395-6	Competition	186
Resting, Glimpse of Judging Ring	188	Wolf Trap, Russian	56
Rider (Miss Spencer), Best Amateur		Wool Exhibition	172
Lady	193	W.T. Graft Brought Together and	
Roma Team	192	Ready for Ligation	2

833
Queensland

Department of Agriculture and Stock

Volume XVIII

JULY, 1922



LIBRARY
RECEIVED
AUG 21 1922

Queensland Agricultural Journal



REGISTERED AT THE GENERAL POST OFFICE, BRISBANE,
FOR TRANSMISSION BY POST AS A NEWSPAPER.

**Edited by
J. F. F. REID**

PROFITS

That's another way
of spelling

DIABOLO

Dairymen who want Bigger Profits use the "DIABOLO"—the Separator that gives a bigger cream yield. The Diabolo Bowl is so perfectly balanced that cream cannot possibly slip away. Added to this it is simple in construction, easy to operate—easy to clean. Don't accept a substitute. Buy a Diabolo, the world's best Separator.

WRITE FOR DESCRIPTIVE BOOKLET.

Diabolo Separator Co., Ltd.,

Creek Street, BRISBANE.



RELIABLE

IS THE WORD WHICH TRULY DESCRIBES

TAYLOR'S FODDER SEEDS

Each and every line is tested before being sent out—thus ensuring perfect satisfaction to our customers.

Our new season's stocks are now to hand of Recleaned Algerian Seed Oats, Cape Barley, Skinless Barley, Tares or Vetches, Seed Wheat, Rye Corn, etc. Also for present planting Mangel Wurzel, Swede Turnip, etc.

Write NOW for our Catalogue of Fruit Trees, Rose Trees, and Citrus Trees for 1922 planting. Our trees will all be ready for delivery about June next, and as the time is drawing near, if you have not already ordered, it would be advisable to do so as soon as possible. Catalogue sent on receipt of a line from you.

Vegetable and Flower Seeds of every description for the farm and garden.

CHARLES TAYLOR & Co.,

"THE LEADING SEEDSMEN,"

124-128 ROMA STREET, BRISBANE.

Registered at the General Post Office for Transmission by Post as a Newspaper.]



THE
QUEENSLAND AGRICULTURAL JOURNAL,

ISSUED BY DIRECTION OF

THE HON. THE SECRETARY FOR AGRICULTURE.

EDITED BY J. F. F. REID.

VOL. XVIII. PART 1.

JULY.

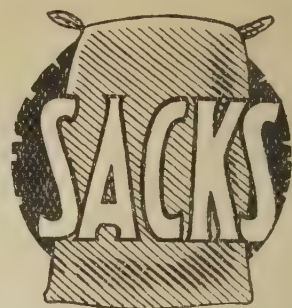
By Authority:

ANTHONY JAMES CUMMING, GOVERNMENT PRINTER, BRISBANE,

1922.



**We
Manufacture
Bags**



Here—in South Brisbane

We specialise for all sorts that Farmers require. We Stock Second Hand Bags. Every care is taken to send out—only—
Sound Ones.

Prices Right—Write Now

Joyce Bros. (Q.) Limited
Stanley Street, South Brisbane

The Forster Engineering Works

SPEAKING OF REPAIRS?

We Specialise in Repairs of every description, particularly Machine-cut Gears in Iron, Steel, Gun Metal, Raw-hide, etc.

Horse and Cattle Brands made; also Ploughs and Ploughshares made and repaired. Inquiries for any class of Machinery will receive prompt and special attention.

Write for particulars.

Forster Engineering Works Ltd.

Engineers and Blacksmiths,

Mary Street (between George and Albert Streets), Brisbane.

A Business Proposition

IT is in your interests to support an Institution established for the benefit of the people of Queensland; **therefore**, consult **The Public Curator**, whose Office exists for your benefit, in all matters relating to the making of Wills (free of charge), Administration of Estates, taking over Existing Trust Estates, carrying on businesses as Attorney, lending money on First Mortgage of Real Estate, giving legal advice free, registering Transfers, preparation of Agreements, &c.

*Branch Offices at ROCKHAMPTON
and TOWNSVILLE, and Agencies
at all Court Houses in Queensland.*

F. W. MOLE,
Public Curator,
BRISBANE.

CONTENTS.

	Page.		Page.
Organisation of the Agricultural Industry	1	Nambour Rural School—A Flourishing Institution	36
Paper Mulch for Pineapple-growing	7	Science Notes (E. J. Jarvis)	39
Coffee-growing in Queensland (A. J. Boyd)	7	More Light on Power Alcohol	45
Improving the Quality of Cotton and the Increase of its Yield (compiled by A. J. Boyd)	8	Queensland Trees (C. T. White)	45
Some Notes on Fusarium in the Tomato Plants in North Queensland (N. A. R. Pollock)	10	The Banana Beetle Borer	48
The Blowfly Pest	12	Setting Eggs	51
Fruit Fly Investigations (H. Jarvis)	15	Sugar: Field Reports	52
The Dairy Herd, Queensland Agricultural College, Gatton, May, 1922	18	Show Dates, 1922 and 1923	53
Grape Culture in Queensland, Part II. (A. H. Benson, M.R.A.C.)	18	General Notes—	
Rainfall in the Agricultural Districts	23	A Possible New Industry: "Shammy," or Oil Leather	54
Butter and Cheese Show	24	Spotted Wilt of Tomatoes	55
The Quality of Export Butter	27	Australasian Association	55
The Summer Fallow	29	A Useful Mouse-trap	55
Stock Feeding	30	The Russian Wolf-trap	56
Cane Pest Combat and Control	32	The Dingo Pest	57
A Mangosteen from North Queensland (C. T. White)	34	Answers to Correspondents—	
		Airedale Terriers	57
		<i>It's</i> a Folding Saw	57
		Report on Egg-laying Competition, Queensland Agricultural College, May, 1922	58
		Certificates of Soundness	60
		Farm and Garden Notes for August	61
		Orchard Notes for August	62
		Astronomical Data for Queensland	63
		Departmental Announcements	XIII.

Queenton Seeds We Grow

Early Jewel and Ponderosa Tomato, Sugar Melon,
Giant Rock Melon, Iceberg Lettuce, Giant Rhubarb,
White Spine Cucumber, Rosella, Crested Cosmos,
Giant and Striped Zinnia, Double and Single
Dianthus, Phlox, Calendula, Sweet Peas, etc.

All 6d. per packet

SEED LIST ON APPLICATION

E. MANN & SON

Seed Growers

Charters Towers

*There's no
Shirt
like it !*



The Santwill WORK SHIRT

Sand in Colour

Twill in Quality

is the Strongest WORK SHIRT made for the money and is made by PIKE BROTHERS LTD. on the premises

QUALITY—The "SANTWILL" Fabric is soft and durable and of tenacious strength — in fact, seems to grow strength in every wash, and will launder well and often.

WORKMANSHIP—The object in speaking of the "SANTWILL" Workmanship is because of its unusual excellence—Skilled Shirt Makers apply every ounce of knowledge, giving that comfort and fitting essential in Work Shirts.

FINISH—It is extra strongly sewn throughout—strong, unbreakable buttons permanently sewn on—two spacious Breast Pockets and finished with a comfortable fullness.

The "SANTWILL" IS Different

8/6 EACH — 3 FOR 24/-

MAIL FOR THREE TO-DAY !

Write to Desk A.J.

PIKE BROTHERS

LIMITED

TOWNSVILLE

BRISBANE

TOOWOOMBA

QUEENSLAND AGRICULTURAL JOURNAL

VOL. XVIII.

JULY, 1922.

PART I.

ORGANISATION OF THE AGRICULTURAL INDUSTRY.

The Provisional Council of Agriculture—A Record of
Progress.

Laying the Foundations for State-wide Rural Co-operation.

Since its constitution in April last the Provisional Council of Agriculture has met on three occasions, and a brief summary of its activities and deliberations to date is set out hereunder.

1. Scheme for Organisation of the Agricultural Industry.

(a) *Queensland Producers' Association—*

The Council has adopted a scheme the outlines of which are as follows:—

- i. That there shall be established an Association, to be known as the Queensland Producers' Association, which shall be open to Dairymen, Fruit-growers, Wheatgrowers, Small Graziers, Canegrowers, Sugar Producers, and General Farmers.
- ii. The Association shall consist of a Provisional Council of Agriculture District Councils, and Local Producers' Associations.

(b) *Provisional Council of Agriculture—*

- i. That, pending the appointment of a Council of Agriculture, a Provisional Council shall be constituted, to consist of 22 members, comprised of the following:—

- 5 direct appointees of the Government,
- 5 Dairying representatives,
- 5 Fruitgrowers' representatives,
- 4 Sugar-growers' representatives, and
- 3 General agricultural representatives.

- ii. That vacancies shall be filled by the appointment of another representative for the particular division in which the vacancy occurs.
- iii. That further members may be appointed if deemed necessary by the Council.
- iv. That, briefly, the objects of the Council shall be as follows:—
 - To generally co-operate with and assist District Councils and Local Producers' Associations;
 - To engage in research work and subjects relating to the rural industries, and secure effective action for the controlling of diseases and pests;
 - To secure additional markets and improve the means of transport and distribution of produce;
 - To standardise products and assist and advise the Department of Agriculture and other State Departments;
 - Generally, to investigate and deal with all problems relating to the rural industries.
- v. That Standing Committees be appointed to report on or deal with any matters referred to them by the Council.

(c) *District Councils*—

- i. That in each district determined by the Council of Agriculture a District Council shall be established;
- ii. That pending the establishment of District Councils, the Governor in Council, upon the recommendation of the Council, may constitute provisional District Councils, the members of which shall also be appointed in the same manner. Provisional Councils so constituted shall in the ordinary course hold office for one year;
- iii. Subject to the general control of the Council, the duties of the District Councils shall include consideration of schemes with regard to production, marketing, standardisation, and the making of more profitable use of the State experts and facilities generally of the Department of Agriculture to encourage co-operative buying and selling among the primary producers in the areas covered by them, and to promote such matters as herd testing, fodder conservation, and similar activities;
- iv. To assist in every way possible the Local Producers' Associations within their areas;
- v. Generally to discharge such duties and functions as the Council may determine.

(d) *Local Producers' Associations*—

- i. Each sub-district may form a Local Producers' Association, which shall be open to all *bonâ fide* producers within the sub-district.
- ii. Subject to the general control of the District Council and the supreme control of the Council of Agriculture, duties of Local Producers' Associations shall include taking the initiative in rural matters within the sub-districts; formulating schemes to meet the requirements of producers within the sub-districts; bringing before District Councils problems of any interest and concern; generally assisting and supporting District Councils in promoting the prosperity of primary producers.

2. Standing Rules and Orders.

The Council has adopted a number of standing rules to govern its general procedure at meetings and otherwise.

3. Director, Queensland Producers' Association.

Steps have been taken with the object of securing a Director to administer (subject to the control of the Council) the affairs of the Queensland Producers' Association. The term of the appointment has been fixed at three years, and applicants are required to possess expert business, financial, and organising qualifications. Applications have been invited through the public Press of Australasia, and the closing date has been fixed for the 30th June.

4. Delegates.

A number of delegates have been temporarily appointed to visit various centres and expound the new scheme. A large number of rural districts have already been visited, and reports to hand indicate that the scheme is meeting with the unanimous approval of producers.

5. Legislation.

Legislation with respect to the constitution of the Queensland Producers' Association will be submitted to Parliament during the coming session.

6. Provisional District Organisers.

Provisional District Organisers are to be appointed forthwith. Their duties will be to follow up the work of the delegates by systematically organising the respective districts to which they are appointed, and to generally assist in the formation of Local Producers' Associations and District Councils.

7. Amendment of Fruit Cases Act.

The Government is being requested to amend the Fruit Cases Act to provide for such alterations in standards as may be found necessary from time to time.

8. Banana, Citrus, and Pineapple Standards.

The Department of Agriculture has been requested to adopt certain standards relating to bananas, citrus fruits, and pineapples, approved at recent meetings of fruitgrowers in Southern Queensland.

9. Fruit Pools.

The Government is being requested to introduce legislation of a comprehensive character, framed to cover all sections of the fruitgrowing industry, and provide for ballots to be taken of all growers, prior to making any particular pool operative.

10. Fruit Instruction and Inspection.

The Department of Agriculture has been requested to arrange for more effective instruction and inspection with respect to the picking, grading, and packing of fruit products.

11. Utilising Surplus, Waste, and Inferior Fruits.

Steps have been taken to associate the Agricultural Chemist with the Standing Fruit Committee in fully investigating the possibilities of utilising surplus, waste, and inferior fruits and vegetables.

12. Standards of Containers.

Federal Authorities are being requested to consult the Council of Agriculture prior to making any departure from the present standards of containers in use in Queensland.

13. Transport Facilities in the Carriage of Fruit.

A number of suggestions brought forward by the Standing Fruit Committee for the purpose of improving the transport facilities in the carriage of fruit over the Queensland Railways, and reducing freights on fruit, have been recommended to the Transport Committee for favourable consideration.

14. Fruit Fly.

The New South Wales Department of Agriculture is being requested by the Queensland Authorities to inquire into the matter of fly-infested orchards in New South Wales adjacent to the Stanthorpe district, with the object of having the orchards in question either cleaned or destroyed.

15. Fruit Trees true to Type.

The Department of Agriculture has been requested to take steps to ensure that trees supplied to growers by nurserymen are true to type.

16. Sugar Agreement.

The Council has decided to take steps, through Local Producers' Associations and District Councils, to further by every means a continuance of the present Sugar Agreement.

17. Productivity of Sugar Lands and Utilisation of Waste Sugar Products.

The Council is of opinion that, in regard to the question of the improvement of the productivity of sugar lands and the utilisation of waste products, everything possible is now being done, but that new developments will be kept in view.

18. Wheatgrowing. Improving Cultural Methods.

The Council, in conjunction with the Department of Agriculture and the State Wheat Board, has succeeded in effecting a considerable improvement in the cultural methods of wheatgrowing in Queensland. The scheme prepared by the Council has been adopted by the Wheat Board. It provides for the purchase by the Wheat Board from the Department of Agriculture of a quantity of specially selected seed, which will be grown under special conditions. The wheat so harvested will, in turn, be reserved for seed purposes. A new list of recommended varieties has been drawn up, and these have been allotted to certain districts, where each will be planted on a specified class of soil.

19. Organisation of Maizegrowers.

With a view to organising maizegrowers, the Department of Agriculture, on the recommendation of the Council, is now arranging to collect from growers statistical and other information for the purpose of enabling it to prepare a concrete scheme for the betterment of the conditions of maizegrowers generally.

20. Bulletins.

The Council has decided that bulletins and other literature will be issued from time to time for the purpose of keeping producers fully advised of its various activities.

21. Loans to Farmers.

To further assist in the development of the State's agricultural resources, the Council has made recommendations to greatly extend the scope of operations of the existing Co-operative Agricultural Production and Advances to Farmers' Acts.

The proposed advances are wide in their scope, and are framed to meet the needs and requirements of new settlers who may be starting operations for the first time, or others whose holdings require developing.

The Council's recommendations are intended to assist in the purchase of dairy cattle; purchase of pigs; purchase of sheep; erection of silos; erection of hay-sheds and purchase of hay-making machinery; co-operative purchase of machinery to assist agricultural production; co-operative purchase of entires, bulls, rams, and boars; construction of grain storage silos, and sheds and accessories for the storage and handling of grain.

To improve the existing marketing system, advances have also been recommended to provide for the construction of grain storage silos, &c.

22. Herd-testing.

In recognising the importance of herd-testing, the Council has decided to circulate, through Local Producers' Associations and other bodies, full information relating to herd-testing methods and their advantages generally.

23. Fodder Conservation.

The Council is of opinion that the question of fodder conservation is one of extreme importance, and it has now under consideration a scheme in this connection.

24. Additional Entomologists.

The several Standing Committees had stressed the need for the appointment of additional Entomologists to study the pests affecting all branches of the primary industries, and the Council has decided to advocate close co-operation between the Department of Agriculture, the University of Queensland, and other interested bodies, with a view to arranging for the training of men on sound scientific lines who will be able to assist in discovering means to deal effectively with such pests.

DAIRY ADVISORY BOARD.**A RECORD OF ACTION AND ACHIEVEMENT.**

A summary of the activities and deliberations of the Dairy Advisory Board is outlined hereunder:—

1. Transport.*(a) Improved Service for Transit of Dairy Products over Queensland Railways.*

The Commissioner for Railways has been asked to increase the number, and effect an improvement in the design, of trucks utilised for the conveyance of dairy products, and also to see that cream is delivered by the first possible train to factories.

The Commissioner has expressed a desire to meet the Board to discuss these matters, and arrangements are now being made for the above meeting to be held on Wednesday, the 7th June.

(b) Manufactured Dairy Produce.

The Board was successful in inducing the Railway Authorities to make a 20 per cent. reduction in rail freights on manufactured dairy products from factories to markets.

(c) Cream.

A request for a similar reduction with regard to cream has also been successful.

(d) Bacon Factory Products.

Cabinet decided that a reduction in rail freights on bacon factory products could not be granted.

2. Cold Storage.

As a result of the representations of the Board, a section of the Government Cold Stores at Hamilton will probably be ready to receive dairy produce during the next export season.

3. Marketing and Distribution.

At the instigation of the Board, the Agent-General's Office in London will furnish the Board with a complete report on the conditions surrounding the handling, marketing, and distribution of Queensland dairy produce in London. Suggestions with regard to the improvement of such dairy produce, together with periodical reports on the market conditions, and quality of individual consignments arriving in England, will also be supplied.

4. Crating of Cheese for Export.

The Minister for Agriculture has approved of a recommendation of the Board that all cheese for export be crated at the factories. This will obviate injury in transit, and consequent depreciation of cheese hitherto sent loose by rail to Brisbane. The new decision will be given effect to as from the commencement of the next export season.

5. Herd Improvement.*(a) Utilisation of Purebred Bulls.*

In this connection the Board has recommended the establishment of Government Stud Farms in suitable centres throughout the State, and also an increase in the numbers of purebred dairy stock at the Gatton Agricultural College.

(b) Herd Book Societies' Rules.

Resolutions have been carried by the Board with the object of effecting alterations in the existing rules of Herd Book Societies. The aim of these resolutions is

to obviate, as far as possible, fraudulent practices on the part of stud stockowners, and to ensure that only animals of the highest class secure final entry in the Herd Books after passing a prescribed butter-fat test.

These resolutions are being conveyed to breeders of purebred stock, who are being asked to nominate representatives with power to act, to meet the Board and fully discuss matters.

(c) Herd-testing of Individual Herds.

The Board has prepared certain printed matter which has been handed to the Council of Agriculture with the request that steps be taken to have the information circulated amongst dairymen.

6. Stabilisation of Prices.

Members of the Board have on two occasions visited the Southern States with the object of securing a stabilised price for dairy produce within the Commonwealth. Largely as a result of their efforts (the value of which has been fully recognised in the South) Conferences of Dairymen held in New South Wales and Victoria approved of the principle. These were followed by an all-Australian Conference representative of Dairying Interests, and the Board is convinced that there is every likelihood of early arrangements being made to adopt the principle of stabilisation, by fixing a price for dairy produce within the Commonwealth.

7. Conservation of Fodder.

The Board has given a good deal of consideration to this subject, and has forwarded to the Agricultural Council, for its consideration, a scheme dealing with the matter.

8. Dual Grading of Dairy Produce.

(a) For the information of the Minister of Agriculture, the Board expressed the opinion that the best interests of the producers of Australia would be served if the Commonwealth powers in relation to the grading and examination of dairy produce should be vested in the Department of Agriculture in the various States.

(b) That the grade marking of packages of dairy produce for export should be discontinued.

9. Pasteurisation.

In order to become conversant with the best methods of pasteurising milk and cream, efforts have been made to secure up-to-date information regarding the subject. As a result the Board is now in possession of a number of informative communications from New Zealand and elsewhere, which will be turned to useful account as occasion requires.

10. General Matters.

The value of a controlling body has been largely recognised by dairy farmers and factories, as a considerable number of requests for advice on a variety of subjects are received. In this way the Board has been able to lend a good deal of useful assistance to those engaged in the industry.

11. Amalgamation with Agricultural Council.

For some time members of both the Advisory Board and the Agricultural Council had been of opinion that too many dairying representatives were included on both bodies. At a Conference held in the Premier's Office on the 15th instant, members of both the Board and the Council were unanimous in a desire to have the matter settled, and the question of making a new selection to in future constitute the Dairying Section of the Agricultural Council was left in the hands of the Premier, the Minister for Agriculture, and the Chairman of the Administrative Committee of the Council. It was subsequently announced that six representatives had been selected, and these would in future sit as the Dairying Committee of the Agricultural Council.

PAPER MULCH FOR PINEAPPLE-GROWING.

From the "Agricultural Gazette of New South Wales" we take the following method of using paper mulch:—"The idea of a paper mulch for sugar-cane was patented some years ago, but no experiments with pineapples were conducted until 1919. It is estimated that there are now 461 acres planted in paper, of which 68 acres will fruit in 1922. The paper mulch appears to consist of a strip of paper in which are cut holes large enough for the pineapple plants to grow through. The first yields from the method were obtained last year (1921), and, according to the writer, Mr. A. T. Longley, at the annual meeting of the Hawaiian Pineapple Packers' Association, it was found that the plants in paper grew uniformly larger, greener, and more healthy, and the fruit larger (equal to a little over $3\frac{1}{2}$ tons per acre) and better conditioned. The paper mulch prevents the growth of weeds and the packing of the soil under heavy rains, thus greatly reducing the cost of inter-cultivation. In an experiment at the Hawaiian Pineapple Association's Experiment Station the plant growth on paper mulch was three times greater in weight and much healthier than on other plots." The above answers our correspondent's question on the subject.

COFFEE-GROWING IN QUEENSLAND.

By A. J. BOYD.

When planting out the coffee seedlings, the main root (the tap-root) should stand straight in the hole prepared for it, for its whole length, and care should be taken that the roots are not tangled. When the plant is in position, the surrounding soil should be firmly pressed by hand. Another important matter is to see that the seedling is not planted deeper than it was in the seed-bed or flower-pot; otherwise the bark above the root will decay.

There is no part of the working of a coffee plantation which demands more supervision or greater care than the planting out, because carelessness in this work is not in immediate evidence, but may injuriously influence the thriving or weakness of the future tree. For this reason quick planting and cheap work are eventually dear, and only reliable white workers should be entrusted with this most important labour. It is true that young coffee plants are tough and resistant, but that should be no reason for mishandling them; wherefore the casual losses will be less and the duration of the plant's life longer in proportion to the care taken at the outset.

For the first few days, or even weeks, after planting out, the young trees should be protected from the full heat of the sun by leafy bushes or by a small board placed slantwise in the ground at a little distance from each tree. This may seem troublesome work, but it eventually pays. At intervals of three weeks, and, later, of six weeks, after planting, the young trees should be examined, and sickly or shrivelled ones replaced by healthy plants. It is needless to impress upon the young coffee-planter the necessity for keeping down weeds. For this purpose there are still some planters who prefer to use the old, out-of-date hand hoe of their ancestors, holding the belief that the use of horse-drawn implements is injurious to the trees; but common sense should teach the lesson that the most expensive work on the plantation is the result of the use of the hand hoe, whilst the most efficient work is that done by modern ploughs, cultivators, and harrows.

When the trees have reached the age of between 2 and 3 years, it is time to decide whether they should be topped or allowed to grow to their natural height. Both of these methods have their advantages and disadvantages, and that which may be advantageous in one district may not be suitable for another. There are three objects to be attained by topping and pruning, of which H. Semler, in his work on "Tropical Agriculture," says:—

"These are:—First, heavier bearing; secondly, facility of picking; and, thirdly, protection against high winds. As regards the first point—namely, heavier bearing—there is no doubt that by judicious topping and pruning the crop for the first year or for a series of years can be considerably increased. But experienced planters have, for some time, taken the view that the early increase in the yield of berry can only be obtained at the cost of shortening the life of the topped trees, or of the yield in later years, and that, eventually, when the returns for a series of years are taken into consideration, it is much more profitable not to top the trees."

The pruning of coffee trees is not much practised in South America, but is continued in Southern Asia, in which country not only larger crops were the result, but increased facility for gathering was obtained. Of late, however, even in the

latter country, the trees are allowed to grow freely and naturally, and the planters are quite satisfied with the results.

Notwithstanding this, if, where much topped and pruned coffee is seen, one asks for the planter's reason for this, he receives the reply:—"We would allow the whole of the trees to go untouched if sufficient labour were obtainable at picking time, but since that is often unattainable, and since the picking from untopped trees is more laborious and inconvenient than in the case of trees about 6 feet high, much of the coffee falls to the ground and is lost for want of labourers."

On the other hand, the topping and pruning also demand more labour, and this is done at a different time between the picking seasons, and then, by this arrangement, we manage a suitable distribution of work throughout the year.

In Ceylon, the trees were, and still are, kept to a very low growth. On most of the plantations the trees are topped to $1\frac{1}{2}$ yards in height, and often, as I (the writer) saw during my two visits to Ceylon, to a height of $1\frac{1}{4}$ yards, and even 1 yard was common.

Having, then, decided on topping, and at what height, the planter must wait until the main stem has become brown and woody. There is no need for anxiety about the top, as a mistake is easily corrected. If, for example, it were cut off too high up, the main stem can be cut back at any time, and if too low down, on the other hand, a young shoot near the top can be allowed to grow near the main stem. After the topping, the main stem constantly sends out young shoots, and these must be rubbed off by hand shortly after they appear. When this has been done, the remaining branchlets should be paired; that is to say, one of the two opposite shoots near the top can be allowed to grow near the main stem, and then be cut off, changing from left to right and right to left, and all branchlets which cross each other must be cut off.

It is hardly worth adding that this theoretical work cannot be actually carried out in practice, and one must be content with some such approximate assistance to the main stem.

In the case of Liberian coffee, the methods here given—to keep the trees somewhat dwarfed—cannot be profitably adopted. The growth of the Liberian coffee tree is so vigorous that when it is attempted to keep it low by force, the result is a rich tangle of thriving branches and leaves, instead of a heavier crop of fruit.

Some years ago I grew a considerable number of coffee trees, some of which I topped, whilst others were allowed to carry on their natural growth. When the trees bore, I found that the topped trees bore earlier than the latter, but I cannot remember that there was any difference in the yield, which was very heavy. I had no means of pulping the berries, beyond crushing off the pulp in a gunny bag. The beans dried with the parchment skin were sent to a factory, where they went through the necessary process and returned to me in the shape of excellent coffee, which supplied the household wants for some time. I started a coffee plantation at Lawnton, on the Pine River, but constant dry weather had such a bad effect on all vegetation for a couple of years that I gave up the farm and never heard any more of my coffee trees, although, perhaps, some may still be living in the botanic gardens at Lawnton.

IMPROVING THE QUALITY OF COTTON AND THE INCREASE OF ITS YIELD.

COMPILED BY-A. J. BOYD.

In view of the reported decrease in the quantity and quality of cotton grown in the United States of America and in Egypt, during the year 1919 and previous to that time, the Ministry of Agriculture of Egypt specially invited the Director of Agriculture in the United Provinces of India, Mr. Martin Leake, M.A., to visit Egypt to make recommendations for the improvement of the quality of the cottons grown in that country, and for increasing the yield. Mr. Leake accordingly paid two visits to Egypt, and furnished a report embodying many valuable suggestions to that end. His recommendations with regard to the cotton industry in Egypt are equally applicable to Queensland's conditions, especially his references to the necessity for raising pure seed. This is a most important matter in connection with cotton-growing in Australia to ensure good prices in the British cotton market. Although cotton has been grown in Queensland for many years, there has, in the past, been little attention paid to the raising of pure seed. Much of the cotton grown here was then raised from mixed seeds, with the result that the highest price

was not received for the ginned cotton exported to England, owing to its want of uniformity in length and the strength of the fibre. Mr. Leake said, in his report, that the cotton produced in Egypt is, and must continue to be, diverse, and the various classes required to be produced in quantities approximating to the relative demand. Market flexibility may enable new cottons to be absorbed at a high price up to a certain point, but it must not be overlooked that over-production of the high-priced cotton will reduce its price to such a level that it is not profitable to grow it. Distinction should be made between cottons with an intrinsic value and those with an artificial value.

Also, while diversity of class is required, uniformity within the class is essential.

The general opinion of Manchester is that the demand for goods manufactured from the higher grades of cottons, although at the present time mainly potential, is large enough to absorb at its full relative value as much of the long-staple cotton as Egypt is capable of producing. The area in that country suitable for the production of Sea Island cotton is very restricted, and Mr. Leake reasonably holds the opinion that there is every justification for attempting to develop in Egypt a cotton to take the place of Sea Island. He advises that measures should be taken to see that the two factors "price and yield" should be sensibly equal for all kinds grown, and he summarises these measures under the heads of Economic, Botanical, Agricultural, and Commercial.

1. The *Economic*, includes a knowledge of the normal relative requirements of the different classes of cotton, and their normal relative price is essential. Accurate information is also necessary as to the developments taking place in other countries, which are liable to upset the balance.

2. The *Botanical*.—The main lines of work are—

- (a) Selection, with a view to the isolation and maintenance of pure strains of the existent standard cottons, and also to the discovery of new types;
- (b) Hybridisation, which may be looked upon as a *direct* method of evolving new and improved types; and
- (c) Physiological investigation, which is concerned with discovering the exact relationship between the plant and its environment, so that the latter may be controlled, as far as possible, to the benefit of the crop.

3. *Agricultural*.—By this is implied the testing of strains or varieties evolved by the processes of selection and hybridisation, and also the trial of new methods of cultivation suggested by the physiological investigations.

4. *Commercial*.—Some system of seed control is essential, if purity is to be maintained in the stocks of seed produced.

To enable the production and development of special improved strains of cotton to proceed along satisfactory lines, the following organisation is recommended:—

Firstly, the *Botanical Section*, to be engaged on the establishment of pure races and the production of sufficient seed to allow of adequate experimental trial of these types, and for their subsequent multiplication.

For the next stage, an *Agricultural Section* requires developing, which can deal effectively with the trial of the new types produced by the Botanical Section. The whole country should be divided up into a series of circles, based, as far as possible, on "type traits" dependent on environmental conditions. The "circle" officers would each have an experimental farm under their charge, and should also have an intimate knowledge of their district, its capabilities, and requirements.

The stage following the experimental farm is the *seed farm*, which is concerned with the multiplication of the small stocks of pure seeds into a quantity sufficient for distribution to cultivators.

Mr. Leake hesitates to allot the control of these farms definitely to either the Botanical Section or the circle officers, but considers that it is a matter which can only be decided in the light of experience and with due regard to the factor of personal individuality. When the work of propagation on the seed farm is complete, the *Commercial Section* will take over the further control of the seed.

The circle officer in each circle will keep in touch with the cultivators to whom the seed from the seed farms has been issued, and will advise the *Commercial Section* as to their reliability as cultivators. He will inform the gineries of the names of their cultivators and arrange for their cotton to be ginned separately. The Commercial Section will take over the seed from their crops, mark it with a Government mark indicating that it has been passed as seed to be used for sowing, and issue it, on payment, to growers throughout the district.

This process will take place year after year, fresh seed from the seed farms continually replacing that of the previous year. It is further suggested that the ginners should be licensed for the sale of *taqawi* (seed to be sown), and that the ginners so licensed should assist in distributing seed to cultivators.

The above valuable report appeared in the First Annual Report, 1920, of the Cotton Research Board, Cairo, Egypt. I have considerably condensed it, retaining only those portions which, in view of the almost certain revival of the cotton industry in Queensland, may prove serviceable to our Government in its future dealing with the cotton industry.

SOME NOTES ON FUSARIUM IN THE TOMATO PLANT IN NORTH QUEENSLAND.

By N. A. R. POLLOCK, Northern Instructor in Agriculture.

Occurrence.—Some five or six years ago, this malady was first noticed in the Bowen district, where the tomato is cropped annually over considerable areas. In this district it is now of general occurrence, and few areas, even on virgin soil, are free from it.

At Townsville and in Cooktown it has also been noticed, but other areas where tomatoes are grown for market, such as Guthalungra, Gumlu, Cloncurry, Charters Towers, Cape River, &c., appear to be free.

Description.—The malady is caused by a fungus of *Fusarium* species, which invades the roots and spreads through the vascular tissue, up the stems and branches, and is evidenced, on cutting through a stem or root, by a brownish discoloration of the fibro-vascular tissue. The first indication of attack is usually noted by a bright yellowing of one or more of the bottom leaves, followed by a wilting of one or more branches. Where the plant has a tap-root, the whole plant will suddenly wilt and die off, but where no tap-root occurs, most frequently, one branch will be first affected, to be followed later on by others, until ultimately the whole plant dies off. The period from the first sign of attack to the death of the plant varies either from the resistance of the plant or from the severity of the attack, and plants may either die immediately or linger on for several weeks.

On examining a plant thus affected, the disease may be traced from the pale green or natural colour of a healthy stem showing the extent of its progress upward in the plant through a darker colouring down into the root affected. Other roots may at first appear perfectly healthy, and those parts of the plants nourished from these roots may be also healthy, the disease being at first confined to one main root and a branch on the same side of the plant served by that root, but ultimately the whole plant will become affected.

Action of Fungus.—The progress of the fungus upwards, so denoted by the brownish discoloration, would indicate that the filaments of the fungus grow through the vascular tissue, breaking down the cell walls and filling them up, thus hindering the flow of sap and causing the sudden wilt of the part affected. A somewhat similar manifestation is seen in the instances of ringbarked trees where the sapwood is cut through.

It is possible that the disease may extend to the fruit, but no external signs, or, for that matter, internal signs, have been noticed with the ordinary pocket magnifying glass to indicate its presence.

Age at which Infection Occurs.—This varies a great deal. The disease sometimes shows a few weeks after setting the plants out, and from then on until after the first picking of the fruit.

I do not know of any instance where the disease occurred in the seed bed up to the time of transplanting, and it is not usual to find the disease in plants left in the seed bed, though neglected.

Volunteer Plants.—Self-sown plants appearing in fields where tomatoes were grown the previous season frequently show no signs of affection, whilst an occasion has been noticed in which every volunteer plant was badly affected. In this case, however, the land was sown to another crop, and there is every probability some damage was done to the tomato roots during cultivation.

Resistant Varieties.—While so far no particular variety of tomato has proved immune to attack, it has been observed that some varieties are more resistant than others. Early maturing sorts, notably "Chalk's Early Jewel," appear more subject than main crop varieties, in which "Burwood Prize" and "Buckeye" are favourites.

Period of Soil Infection.—No data are available as to the length of time the fungus may retain vitality in the soil, in the absence of a host to live upon, but evidence is abundant that the infection becomes greater when tomatoes succeed tomatoes.

DEDUCTIONS.

Seed.—It is apparent that disease is carried on the seeds. The practice of purchasing seed every year, in trying out new varieties from Southern parts and overseas, is common amongst Bowen farmers, and the appearance of the disease in isolated parts where tomato-growing is only occasional, tends to give credence to that view.

Soil.—Soils may have a bearing on the susceptibility of the plant. On the coast, where the disease has only so far manifested itself, acidity in the soil is common, while inland soils are usually neutral or slightly alkaline. At Bowen, where the disease has been under observation last season and this upon over seventy farms inspected, it has been noticed that there is no perceptible difference in the resistance of plants growing on the many different classes of soil, from the heavy black to the light sandy alluvials, which, to the best of my belief, are all more or less slightly acid.

It has been noted that seed probably carried spores of the fungus in the first instance, but when plants are set out and portion is healthy and portion affected, it is apparent that disease can be contracted through the soil.

Instances have been noted where plants from the same seedbed on virgin soil have contracted the disease when set out in old soils. Also, occasional instances of diseased plants have been noted where plants raised from seed from a disease-free district, in seedbeds on virgin soil, were set out in absolutely virgin soil.

It is evident that the fields on which diseased plants have grown carry infection, and that this infection can be carried to other soils by cultivating implements or other mechanical means.

How Infection Occurs.—As previously noted, infection probably occurs in seed. It may also develop in the root of the seedling, but I am inclined to believe that entry is more often obtained through damaged roots, in lifting from the seedbed, or from cultural implements afterwards. Observations on lightly affected plants incline to this view when, in tracing the disease down into the root, the darkest portion of the discoloration has been found to occur where the root has been damaged, while further on, to the end of the root, the fungus did not appear to have extended. Last season, when setting out, the roots and stems of plants, as far as the bottom leaves, were dipped in a solution of 1 part copper sulphate to 500 parts by weight of water, with a view to sterilising the broken rootlets, and at the same time they were watered with the same, or a weaker solution. Although complete immunity was not gained, it was noted that treated plants were longer in developing the disease than untreated.*

If the entry of the fungus is facilitated by damage to the roots, it is probable that these plants contracted the disease after the roots had grown beyond the soil in which the fungus spores should have been killed by the watering with the bluestone solution, and that then had received damage from cultural implements.

Were it only possible for the plant to contract the malady from injured roots, it might be possible, by treatment, to keep the plants free, and by a rotation of crops, to kill the fungus out by starvation.

Once contracted, it is apparently absurd to attempt curative measures on the plant, even if such could be successful, whilst a sterilisation of an affected soil by mechanical means would appear too expensive, especially when reinfection could so easily occur.

A rotation of crops naturally is suggested, and this, in my opinion, will be the prime factor in disease control. It may be found later that the influence of one or more particular crops may have a greater effect than others in lessening soil infection, especially if such are ploughed under. The sweetening of the soil by liming and increasing the amount of plant food by applying fertilisers to ensure a vigorous growth are necessary operations, more conspicuous in their neglect than otherwise amongst Queensland farmers.

In addition to the foregoing, and equally as important, will be the raising of disease-resisting strains and more careful attention to seed selection.

*Where plants were not dipped in this solution many were lost by cutworms, but in no instance was their attack manifested on plants that had been treated.

The view is often expressed that no person can select seed better than the farmer himself, and the spread of *Fusarium* to Bowen and other parts of North Queensland, must be directly traceable to infected seed raised elsewhere. Given a proper system of fertilising, rotation of crops, and special varieties, the use of copper sulphate in sterilising wounded roots, and the systematic spraying of the foliage, the tomato should remain a most remunerative crop in Bowen and other centres of the North.

THE BLOWFLY PEST.

REPORT OF THE SPECIAL BLOWFLY COMMITTEE, INSTITUTE OF SCIENCE AND INDUSTRY.

HISTORICAL NOTE.

When the Director of the Institute of Science and Industry (Mr. G. H. Knibbs) was in Brisbane recently, he instructed the local Special Blowfly Committee to furnish the Press with a comprehensive review of the experimental work which has been carried out in Queensland. The subject is a very important one to the pastoral industry, and a very great deal of research and experiment has been devoted to it in the effort to find a method or a specific which will relieve the prime industry of the Commonwealth from its greatest menace. The committee, therefore, has decided to issue all the useful information at its command in the form of short articles, dealing with their investigations into the different phases of the problem. The investigations will be considered under the following headings:—

1. The beginning and effects of the pest.
 2. Measures taken to combat blowflies—
 - (a) Department of Agriculture and Stock;
 - (b) Institute of Science and Industry.
 3. Methods of destroying flies—
 - (a) Traps and poison bags.
 - (b) Parasites and natural enemies.
 4. "Jetting."
 5. Dipping.
 6. Conclusions and recommendations in considering the data given above.
- The present article combines Nos. 1 and 2 of the series.

EFFECTS OF THE PEST.

For very many, probably hundreds of, years sheep flies have been known to British sheep-farmers, yet it has not been, nor can it be, the serious problem in Britain which it is in Australia. Where they are comparatively small flocks, say, under a thousand head, it is an annoyance. Here, where the numbers range from thousands up to hundreds of thousands, the fly pest is a menace, the losses from which in the past ten years have run into millions of pounds sterling. In Britain, too, there is a respite every year owing to the presence of snow and ice for several months, while in Queensland especially, flies are in evidence whenever there is a fall of an inch or two of rain, whatever the season of the year. Last winter, for instance, flies were very active on Dalmally. Therefore we cannot use British experience under Australian conditions. We must work out our own salvation. Whether we have done so or not will be seen later.

As was pointed out by Mr. W. W. Froggatt, of New South Wales, in his "Bulletin No. 5, on Sheep Maggot Flies," rams' heads have been blown "since far distant days." In Queensland rams' head blankets, saddlecloths, wool bales, &c., have been attacked by flies for the past forty years at least, but it was not until about 1896 that lambs' tails were noticed to be attacked, thus necessitating dressing. Then came a series of dry years which culminated in the big droughts of 1900-1902, when Queensland lost over ten millions of sheep. All the losses were put down to drought, yet it is possible that flies may have taken their quota. In any case, from 1902 on to 1913 fly attack became more and more severe, until in the latter year reported losses were so great that the Government deputed Mr. A. H. Cory, M.R.C.V.S., and Mr. Edmund Jarvis (Assistant State Entomologist) as a Commission to inquire into the matter. With them was associated Mr. W. G. Brown (State Sheep and

Wool Expert). They visited the Longreach, Peak Downs, and Springsure districts. Forty pastoralists, representing over one million of sheep, were visited, and results showed that an average of 23 per centum of the sheep had been struck. Five stations had from 40 to 70 per cent. affected. In Messrs. Cory's and Jarvis's report, "Sheep Maggot Fly Pest, October, 1913," a recommendation was made that the State should establish a set of experiments to try and find a specific or a method of dealing with the problem. This recommendation was adopted, and in 1914 650 ewes were purchased and taken to Gindie State Farm, in the Emerald district, Central Queensland. Here, in the course of four years, trials of numerous dips, dressings, fly traps, and other methods of combating the fly were tried under field conditions. Among all the dips and dressings tried none was found effective except it was poisonous, and even then effective for a short period only. Traps were tried with a certain amount of success as far as catching flies in large numbers was concerned. The Orion Downs method of jetting a poisonous dip was also tried, with a success which gave hope for something better in the future. All these trials will be discussed in detail in their place. At the close of 1918 the Institute of Science and Industry appointed a Special Blowfly Committee in Queensland, and the experiments at Gindie State Farm were handed over to that body.

COMMONWEALTH INSTITUTE.

At the latter end of 1917 the Commonwealth Institute of Science and Industry decided to put aside a sum of money to be devoted to the investigation of the problem of combating the blowfly pest in the Commonwealth. In February, 1918, a Queensland Committee was appointed by the then Director (the late Dr. Gellatly). It consisted of Messrs. S. P. Fraser (representing the pastoralists), A. H. Cory, M.R.C.V.S. (Chief Inspector of Stock), J. B. Henderson (Government Analyst), and W. G. Brown (State Sheep and Wool Expert), who at that time was in charge of the Gindie experiments. An announcement was made in the Brisbane Press that a suitable station was desired on which to operate. The Committee was very fortunate in receiving an offer through Mr. J. M. Hunter, then Minister for Lands, from Mr. W. A. Russell, of Dalmally Station, Roma. The station was inspected by the Committee, who found that it was eminently suitable. Mr. Russell was very enthusiastic, and it was owing a good deal to his public spirit and generosity that the way was made smooth for the experiments. At his own expense he installed a shower dip, a 60-ft. swim dip, a jetting plant second to none in the State, and furnished as many sheep as were required, with yards, &c., for the working of the experiments. On acquiring these facilities the Committee decided to work on the lines which, on the strength of results of the Gindie experiments, had been found the most promising. These were the use of poisonous dips, the use of jetting plants after the method of Orion Downs, the trying out of fly traps, &c., and the study on the entomological side of flies and parasites. For the latter purpose an entomologist was appointed to take charge of the scientific side of the problem. When the Dalmally experiments were in full operation the State experiments at Gindie were suspended. It has been said that experiments since 1914 have been very slow in achieving results, but it must be remembered that since the fly became very serious, fifteen years ago, the whole pastoral community has been working, mostly in the dark, towards control of the pest, and unsuccessfully. Necessarily there has been much groping in the dark since the beginning of experiments. Then, again, there have been several breaks of continuity during the dry years, when flies were quiescent. However, enough has been done, and many lessons have been learnt, both from the practical and scientific side, to warrant the committee in saying that there is a strong hope that the evil can be controlled, and at a reasonable cost. The above is a very bare outline of the work attempted in Queensland, and it remains now to give in detail the operations themselves with all available information.

METHODS OF DESTRUCTION.

The following notes deal with methods of destroying flies—

- (a) By traps and poison bags.
- (b) By parasites and natural enemies.

Traps.—Traps were first used about nine years ago, when they were advocated by Messrs. Cory and Jarvis. Claims were soon made by persons interested that the fly pest could be controlled and blowflies eventually exterminated by means of traps. Many styles were put on the market, together with different lures; and, when first tried, the enormous catches of flies led the pastoralists and others to believe that this means was likely to be successful. The result of this belief was the installation of thousands of fly traps throughout the country; but it was soon seen that, although the catches in most cases were large, the effect upon the number of flies was not noticeable, and that the paddocks where trapping was in vogue had practically as many sheep struck as those where no traps were set.

From careful observations, we were forced to come to the conclusion that trapping was, firstly, not practicable on a large scale owing to cost, and, secondly, that it had no appreciable effect on the number of flies in the paddock. The reasons for statement No. 1 are—

- (a) Baited traps become very much less effective three or four days after being set;
- (b) There are no lures which are effective over a length of time;
- (c) To be of any value at all the traps must be very close together, as the fly seems to be very local and does not appear to travel very far from its seat of origin;
- (d) The labour attached to baiting and attending traps is considerable and expensive, and not a position much sought after by the available labour, and unless the traps are attended to daily they soon become ineffective.

Spiders spin webs across the entrances, the baits become unattractive, while rain spoils most of the traps, necessitating emptying and rebaiting.

With regard to the second reason, when traps are working well and are well attended to, the flies appear to be just as numerous as ever within a short distance of the trap, and it seems impossible to have them close enough to catch most of the flies.

Poison Bags.—With regard to poison bags, these were found to be practically valueless. The baits soon become unattractive and hard, and only when freshly poisoned do they catch many flies. Poisoning of dead offal is, however, a good means of destroying a great number of flies. It has been found at Dalmally that a mob of sheep jetted with arsenic will kill more flies than all the traps or poison bags set about the yards. After jetting, flies are always to be seen dead in great numbers about the yards and shed.

Parasites.—Apparently the best controller of the fly is the chalcid wasp. There are several different species known, the most common being the *Nasonia brevicornis*; the other species are scarcer. The *Nasonia brevicornis* is practically always present, and can be obtained by taking pupæ from any carcass or offal and allowing them to hatch out in a glass jar with a stopper of cotton wadding in the mouth, or a piece of cloth tied over it. It can easily be ascertained, by counting, what percentage of the pupæ hatch out chalcids or flies. But while the chalcid wasp has been found nearly all over Queensland where sheep are stocked, the fly pest has been steadily increasing. At the beginning of any fly attack, only about 25 per cent. of the pupæ are found to be parasitised; that is, every fourth pupa is breeding out from ten to twenty wasps instead of one blowfly. On the other hand, towards the end of a fly attack, over 80 per cent. of the pupæ have been found to be parasitised; that is, at least four out of every five pupæ are breeding wasps—about a dozen wasps each; the fifth is producing one blowfly. These considerations led us to think, at an early stage of the investigations, that the cultivation and distribution of the wasps would prove a very important factor in checking the flies. Investigations later on, by Professor T. Harvey Johnston and Mr. O. W. Tiegs at the Queensland University (see "Queensland Agricultural Journal," March, 1922), showed that the chalcid wasp in question only attacks those pupæ which are exposed on the surface, as it cannot burrow underneath. Unfortunately, the majority of the maggots burrow before pupating, these pupæ being therefore beyond the reach of the wasp. This probably explains why the chalcid wasp has not played a more important part than the early investigations forecasted, as the statistics then obtained only applied to pupæ found on or near the surface, where the wasp could most likely get at them. Other parasites than the chalcid wasp (*Nasonia brevicornis*) are known, one of which attacks the maggot before it pupates. Much investigation, however, into the life history of these parasites requires to be done before a definite scheme of utilisation of them can be devised. It promises, in the long run, to be the cheapest and most effective control of the blowfly pest. At present not nearly sufficient is known to offer any immediate relief. Owing to lack of funds, investigations are not being made in this direction by the Committee, but valuable work is being done on flies and their parasites by members of the Biological School of the Queensland University.

Natural Enemies.—Birds are most useful in destroying pupæ and the flies themselves. In Queensland, in sheep-grazing country, bird-life is not over-plentiful, but there are several species that are of great use. They can be classed under two headings—

- (a) Those that clean up all offal and carcasses; and
- (b) Those that feed upon the pupæ and flies.

We have, of those that clean up the carcasses and offal, hawks, scavenger kites, and crows; and those which take the flies and pupæ include the magpie, peewee,

swallow, willie wagtail, and several others. The most useful and persistent of these appears to be the willie wagtail, which eats flies, maggots, and pupæ. They follow the sheep about when feeding and alight on their backs, catching the fly when attacking the sheep. However, the natural enemies, like the parasites, do not prevent recurrent bad attacks by blowflies.

To sum up, it does not appear as a result of our investigations, so far, that either traps or poison bags are ever likely to prove an effective or economical means of dealing with blowflies on our large grazing areas. With regard to parasites, although a most promising method of attacking the problem, no parasite is at present known which is likely to be an important factor in the control of the pest. It must be remembered, however, that this is by far the most economical method of attack, and it is earnestly hoped by the Committee that funds will soon be made available from some source for a systematic investigation along this line of attack. The protection and encouragement of bird-life, particularly of the insectivorous birds, while not by any means a solution of the problem, is at least a factor which should not be neglected.

The succeeding articles will deal with dipping and jetting, and the last of these articles will be practically a résumé of each.

FRUIT FLY INVESTIGATIONS.

[THIRD PROGRESS REPORT.]

By HUBERT JARVIS, Entomologist in Charge of Fruit Fly Investigations at Stanthorpe.

The Minister for Agriculture and Stock (Hon. W. N. Gillies) has made available the Third Monthly Report of Mr. Hubert Jarvis, dated 16th May, 1922.

WINTERING OF FRUIT FLY.

The Queensland fruit fly *D. Tryoni* is still occasionally to be met with in the Stanthorpe district during the warm hours of the day (i.e., between 11 a.m. and 4 p.m.) in the vicinity of packing sheds, or in any such situation where fruit is stored. It is, however, but rarely seen at this time of the year in the orchards, nor has it been observed sheltering in the packing sheds.

The majority of the fruit flies kept in captivity in the laboratory are still alive, although a number have succumbed, most probably owing to the low temperature obtaining at night and early morning during the last ten days. Frosts have, in fact, been experienced for several consecutive nights.

Fruit flies subjected to outside (natural) conditions at night had apparently perished when examined in the morning; but in nearly every case they have revived on being warmed by the sun. The female fruit fly seems less able to stand cold conditions than the male, casualties due presumably to this proving to be almost invariably those of females.

No indication of the fruit fly's hibernating as a mature insect has so far been noticed.

PUPATION OF FRUIT FLY.

Location.—Pupæ have recently been found in the ground, below cases of stored apples and quinces, and these pupæ have so far, failed to give rise to flies. It seems probable, then, that a small percentage may winter in this condition, in or under the packing sheds.

Fruit fly maggots do not necessarily always require access to the soil to enable them to turn to the pupa or chrysalis, for they will complete this change in any dry corner of a shed, packing case, or even when wrapped in paper. Usually, however, the instinct of the maggot seems to direct it to the soil, and it will squeeze, almost miraculously, through the smallest crack in its effort to reach the ground.

The soil under the wooden floor of the packing sheds (in many cases the soil is the floor) is generally both very hard and dry, and the maggots would, in gaining it, have to content themselves with about a quarter of an inch depth of dry dust in which to pupate.

Darkness.—The need of darkness is probably a governing factor in this persistent effort of the maggot to reach the soil—i.e., to get under cover away from the light.

The majority of a number of full-grown maggots, taken when just emerged from the fruit and kept in a shallow box and exposed to full light, failed to complete the change to the chrysalis for from ten to twelve days. On the other hand, similar maggots confined at the same time in a dark box, without soil or any cover, all pupated within twenty-four hours.

Temperature.—This is also undoubtedly a very important factor in determining the duration of the pupal period. Thus pupæ under observation in the laboratory as winter proceeded, gave the following results in transformation:—

Host.	Date of Pupation.	Date of Emergence.	Number of Days.
Apple	16 February, 1922 ..	22 February, 1922 ..	6
Apple	28 February „ ..	8 March „ ..	8
Apple	7 March „ ..	18 March „ ..	11
Quince	20 March „ ..	14 April „ ..	25
Pear	6 April „ ..	13 May „ ..	37
Apple	20 April „ ..	None to date	..

Note.—No fruit flies have emerged since 13th May, 1922. (Instruments were not available for the determination of the temperatures obtained during the periods mentioned.)

PERSISTENCE AS MAGGOTS.

Fruit-fly maggots are still present in stored fruit, although specimens under observation therein are very inactive, the temperature of the fruit, away from the sun, remaining very low all day.

SEASONAL ABSENCE.

Although probably not actively present in the Granite Belt area during the winter months, it is possible that the fruit fly may be met with then at a lower altitude than at present, and it is hoped to secure information relating to this possibility at an early date. The importance of safeguarding the fruit industry by “cleaning up,” not only in our own district, but also in adjacent ones, where fruit trees are also grown, can hardly be too much stressed. Should the fruit fly be (as is quite likely) a seasonal visitor to this district from over the border, then adjacent orchards, if neglected, would be a very serious source of infection, and would, moreover, render partially ineffective the watchful care and cleanliness which we sincerely hope will be the aim of every orchardist in the coming season to preserve and exercise.

COLD STORAGE OF FRUIT.

A question—certainly one of very much interest—is that of subjecting fly-stung fruit, especially in the earlier stages, to the influence of low temperature (*i.e.*, cold storage) in order to kill the eggs and maggots of the Queensland fruit fly (*D. Tryoni*).

One experiment in this connection was originated by Mr. A. H. Paget, of The Summit. Mr. Paget sent ten cases of fly-stung apples (in which the maggots were mostly fairly well developed, but in which, also, both the eggs and young larvæ were represented), to Sydney, N.S.W., and had them subjected (in cold storage) to a temperature of from 33 to 34 deg. F. for a period of three weeks.

On their arrival, on being returned to Stanthorpe, a number of these apples were examined (about fifty) in this Office, and in every case, the maggots encountered therein were found to be dead, and had apparently been so for some time, as most of them were black and decomposed.

This certainly seems a step in the right direction, and were destruction by this means generally possible, such procedure should obviate the danger of fruit developing maggots from contained eggs after leaving the district, and when in the shops in Brisbane, or other centres, which so often happens with “stung fruit.” A very much shorter time for submission to cold than three weeks would, however, probably be found effective.

(The results obtained by Messrs. E. A. Back and C. E. Pemberton, who recently carried out experiments in subjecting the eggs and larvæ of the Mediterranean fruit fly (*C. capitata*) to cold storage temperature in Honolulu, Hawaiian Islands, are as follow:—“No eggs or larvæ of the Mediterranean fruit fly survived refrigeration at 40 deg. to 45 deg. F. for seven weeks, at 33 deg. to 40 deg. F. for three weeks, or at 32 deg. to 33 deg. for two weeks.” (“Journal of Agricultural Research,” vol. v., No. 15.)

Experiments in this direction could be carried out in regard to our own fruit fly (*D. Tryoni*), and there is every reason to suppose that very similar results would be obtained.

Provided that it is an assured financial proposition to establish in the Granite Belt a central cold storage plant, it does not seem too great an assumption to conclude that such a cold storage must prove a very valuable asset to the district from the point of view that the results of these experiments constitute.

OTHER INJURIOUS INSECTS.

Grain Weevil.—An insect which is causing a certain amount of damage to stored apples is the "Grain Weevil" (*Calandra Oryzæ*), a member of the Fam. Curculionidæ. This little beetle mines and tunnels in the fruit, chiefly at the calyx end, causing a disfigurement of the apple, and probably also rendering the subject of attack more liable to the development of fungus troubles.

It has not so far, however, been known to damage fruit in the orchards, and is usually present only in apples exhibiting some mechanical injury.

Thrips.—An instance of these minute and interesting insects attacking garden shrubs (*Lauristina* sp.) was brought under my notice by Mr. J. Rudder, of Stanthorpe. The insect in question is probably an introduced one (*Heliothrips* sp.). It has, so far, not been met with on any economic plant or tree in this district. Should it be so discovered, it can be dealt with by spraying with a miscible oil, tobacco extract, or kerosene emulsion.

CASE MOTHS.

Psychidæ.—The case or bag worm moth (*Thyridopteryx hubnerii*) has been found doing a great deal of damage to pines (*Pinus insignis*). Examples of these trees may be seen covered with their neat little caterpillar-cases made of pine needles, and having almost the appearance of small pine cones. This pest has also developed a taste for apple foliage. A lookout, therefore, should be kept for it in the orchards. It can, fortunately, be very easily both seen and dealt with.

Psyllidæ (Lerp Insects).—Specimens were submitted to this Office by the Editor of the "Border Post" for identification, and proved to be examples of one of a group of insects known as *Psyllidæ* (Genus *Thea*).

These curious sap-sucking insects, of which a short account (by the writer) appeared in the "Border Post" (5th May, 1922), happily confine themselves for the most part to our native flora. A European exception, however (*Psylla mali*) is injurious to the apple and causes a good deal of damage.

GRUBS IN PUMPKIN.

From the above source, again, were received a number of dark-brown segmented grubs found in decaying pumpkin. These were examples of the interesting maggot or larval form, of one of the stratiomyid flies (*Neoeuxaireta spinigera*). These flies usually breed in decaying vegetable matter, and are in no way responsible for any primary injury to fruit or vegetables. This fly is quite abundant in the district.

FUNGUS AND OTHER DISEASES.

Several troubles of obscure origin have been sent to this Office and have been referred to the Government Entomologist and Vegetable Pathologist, Mr. Henry Tryon, whose reports on the same have been duly received and have (by the courtesy of the Editor, Mr. J. Scully), been printed also in the "Border Post" of 12th May, 1922, for the benefit of orchardists and others.

PROJECTS ARISING FROM SEASONAL ABSENCE OF FRUIT FLY.

The carrying out, very shortly, of personal inquiries in the entire surrounding country of the Granite Belt area is contemplated. Thus it may be possible to locate the nearest point to this district at which the fruit fly occurs at this season of the year. Reports have reached this Office of an abundance of native fruits growing in the scrubs lying beyond the Queensland border, notably the Taboom Scrub, N.S.W., and it is our purpose to verify, or otherwise, these reports at an early opportunity.

OFFICE WORK.

Some time has been spent studying structural and other differences shown by the two fruit flies *Bactrocera Tryoni* and *B. Tryoni*, var. *solani*, and results arrived at should, when published, prove helpful to those who are interested in distinguishing these insects.

I am indebted to the following orchardists and others for specimens and material:—Dr. S. J. Roberts, Dr. Hurworth, Mr. J. Sewell, Applethorpe; Mr. A. H. Paget, The Summit; Mr. L. H. Flood, The Summit; Inspector F. Williams, Mr. F. Sellars, and Mr. J. Rudder, Stanthorpe.

Visits of inspection have been made to the following districts during the month:—Glen Aplin, Spring Creek, Diamond Vale, and Eukey.

THE DAIRY HERD, QUEENSLAND AGRICULTURAL COLLEGE, GATTON.

MILKING RECORDS OF COWS FOR MAY, 1922.

Name of Cow.	Breed.	Date of Calving.	Total Milk.	Test.	Commercial Butter.	Remarks.
			lb.	%	lb.	
Gay Lassie ...	Ayrshire ...	20 Feb., 1922	960	4.3	48.30	
Prim ...	Holstein ...	6 Feb. "	1,050	3.2	39.00	
College Cold Iron	Jersey ...	25 Jan. "	570	5.4	36.30	
Little Buttercup...	Holstein ...	12 Dec., 1921	780	3.5	31.80	
Magnet's Leda ...	Jersey ...	8 Feb., 1922	540	5.0	31.80	
Skylark ...	Ayrshire ...	7 Feb. "	630	4.1	30.30	
Auntie's Lass ...	"	31 Oct., 1921	589	4.1	28.21	
College Prima Donna	Holstein ...	17 Nov. "	630	3.7	27.30	
Snowflake ...	Shorthorn...	20 Feb., 1922	630	3.7	27.30	
Lilia ...	Ayrshire ...	3 Mar. "	540	4.1	25.80	
Lute ...	"	8 Jan., "	600	3.5	24.30	
College Evening Glow	Jersey ...	11 Oct., 1921	330	6.1	23.70	
College Ma Petite	"	5 Feb., 1922	450	4.5	23.70	
Glow VI. ...	Guernsey ...	28 Aug., 1921	403	5.0	23.56	
Confidante...	Ayrshire ...	8 May, 1922	384	5.2	23.52	
College Nita ...	Holstein ...	26 Feb. "	540	3.7	23.40	
College Buebell ...	Jersey ...	22 Oct., 1921	420	4.7	23.10	
Sheila of Nundorah	Guernsey ...	16 April, 1922	420	4.7	23.10	
Buttercup ...	Shorthorn...	28 Oct., 1921	540	3.4	21.30	
College Wildflower	Jersey ...	10 Dec., "	390	4.7	21.30	
College Promise ...	"	6 Jan., 1922	390	4.5	20.70	

GRAPE CULTURE IN QUEENSLAND.

By ALBERT H. BENSON, M.R.A.C., Director of Fruit Culture.

PART II.

In the June number of the *Queensland Agricultural Journal* questions dealing with the suitability of different types of grapes for different parts of the State, soils suitable for grape culture, the preparation of land for the vineyard and the planting of the vineyard were considered, and we now come to

THE PROPAGATION OF THE GRAPE VINE.

The vine is one of the easiest plants to propagate, and yet it is by no means uncommon to meet with cases where there has been very little success and a bad stand of plants has been the result. The failure, in practically every instance, is due to lack of knowledge, and it can be obviated by carefully following the advice given below:—

Vines can be propagated by seeds, by cuttings containing several eyes or only a single eye, or by layering, and the plants so produced can either be used for the production of fruit or for stocks on which to graft or bud selected varieties. Growing vines from seed is not a matter for the commercial vigneron, but rather for the expert horticulturist who wishes to raise a new variety, and may, therefore, be put on one side.

Propagation by means of cuttings is the method commonly employed, and the cutting consists of a portion of the previous season's growth that is well matured and short-jointed so that there is no great space between the eyes. The cutting should be about 16 in. in length and no more; the use of cuttings of from 2ft. to 3 ft. in length, of which the bulk is left out of the ground, is one of the surest ways to bring about failure.

If the whole of the wood on the vine has matured properly it can all be used for cuttings if required, but it is always best to take the cutting from the older portion of the cane—that nearest to the old wood—as it is always the best matured and the surest to strike.

The canes to be selected for cuttings should always be of the last season's growth, free from anthracnose or downy mildew and grown on vigorous and heavily producing vines. (See Fig. 1.)

When the vines are pruned, the prunings should not be allowed to lie about for days in the vineyard if they are required for cuttings, as if they do so in dry weather for any length of time their vitality is seriously injured and a large percentage fail to strike.

Cuttings should be made as soon as the vines are pruned, or if this is not possible, with no more delay than is absolutely necessary. To prepare the cutting, a clean cut is made with a sharp knife or secateur, just below a joint, as if this is done the cut surface will soon callouse. The cutting is then heeled in or planted, after having been cut to the desired length by making a clean cut just above a joint, or, if wished, through the next joint above the top bud left on the cutting. By doing this there is less chance of the cutting dying out from the top cut.

If wished, a small portion of old wood may be left at the base of the cutting, but of course this can only be done with the base cutting on a cane when a portion of the previous year's wood has been pruned away with it.

Cuttings should be tied into bundles of convenient size, and either heeled in at once or be carefully packed if to be sent any great distance. Every care must be taken in heeling in and packing to see that the cuttings do not dry out, as once they become dry their vitality is seriously injured and many blanks will occur in the vineyard. If properly heeled in when fresh, they will keep in good condition till needed for planting and there should be very few, if any, misses.

Cuttings are either planted out in their permanent position in the vineyard, which I strongly advocate, or they are planted in nursery for a year and are then transplanted to their permanent position.

They are then known as rooted cuttings, and require much greater care in handling than unrooted cuttings, as they dry out rapidly if exposed to the direct rays of the sun or if carelessly handled or packed. Rooted cuttings, when removed from the nursery, should have all their roots other than those at the base of the cutting removed and the base roots shortened to a few inches in length. All the growth of wood that has been



FIG 1.—Perfect
Vine Cutting.

made during the previous season should be pruned back to two eyes at the outside, and the cutting is then ready for planting, as previously described.

The removal of the surface roots causes the vine to root deeply, and there are no roots to interfere with the thorough and deep cultivation of the soil so essential to successful grape culture especially in the hotter and drier parts of the State. The hard pruning back of the wood growth encourages the production of strong new canes, one of which, no matter what type of pruning is subsequently followed, will form the main stem of the resultant vine.

Propagation by means of single eyes is seldom used here, and is therefore only mentioned as a method in vogue in other parts, and then mainly in connection with hot-house culture. Propagation by means of layers is also seldom resorted to, the only occasion in which it is found useful being where there are blanks in a bearing vineyard that it is desirable to make good. Cuttings or rooted cuttings seldom thrive if planted under these conditions, and it is found that the quickest way to fill the blanks is to take a long cane from an adjacent vine, bury it in a trench dug from it to the blank space the vine is required to fill, and bring the cane to the surface there. The cane is still attached to the parent vine, and when it is well established on its own roots it can be cut away from it.

RESISTANT STOCKS.

Several varieties of American and hybrid American-European grapes are more or less resistant to the attack of phylloxera, so much so that, although by no means immune to the attack of this insect, their root-systems are so hardy that they are not seriously injured. As a result, these resistant varieties are used as stocks on which to graft the varieties of commercial grapes it is desired to grow. Most varieties of resistant vines are of no value whatever for the production of fruit, but a few are direct producers, usually of very second-class quality fruit, and are therefore only used as stocks.

A cutting of a resistant vine can be whip- or splice-grafted with a scion of the variety of grape it is desired to propagate, and this work can be done easily and rapidly on a bench or table in a shed or other convenient place. The method adopted is described by Mr. C. Ross, as follows:—

“The whip-tongue graft is best practised on young vines or cuttings, and is performed as follows:—The stock and scion should be of the same diameter. A clean sloping cut is made slightly above the node of the stock, and a corresponding one below the node of the scion. The closer these cuts are made to the nodes the better, for it is near these points that the most of the knitting tissue is formed, and a more perfect union is the result. (See Fig. 2.) A short parallel slit is made about a quarter to half an inch deep, corresponding in each face of the splice. The slit is slightly opened by a turn of the knife to facilitate the insertion of the tongue. (See Fig. 3.) The larger area of cut surface thus brought into exact juxtaposition produces a greater amount of callous or knitting tissue. After being brought together, the splice is kept firmly bound with a ligature of raffia or soft twine.” (See Fig. 4.)

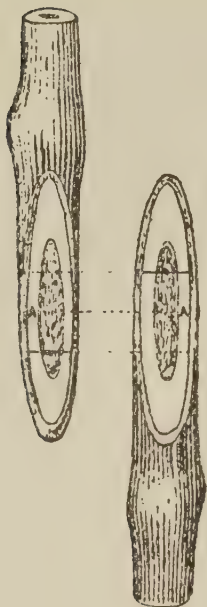


FIG. 2.—How Stock and Scion are cut for W.T. Graft. Centre dotted line shows where the slit forming the tongue is made.



FIG. 3.—Prepared Stock and Scion with tongue opened.



FIG. 4.—W.T. Graft brought together and ready for the ligature.



FIG. 5.—Proper Scion for Cleft Graft.

“After being grafted, the cuttings should be stratified in sand. When calloused they are planted out with the union well below the surface.

Many methods of grafting and budding are employed for working over established vines of indifferent varieties, but for all practical purposes the old English “cleft” and the “whip tongue” grafts are the only two that need be discussed. In my own experience I have found the cleft to be the most successful when grafting old vines level or under ground. The operation is very simple. For instance, select a vine of any age up to twenty years. Saw off the stem above the level of the ground in midwinter (June or July), and paint the transverse section with a mixture of horse dung and clay or lime and sulphur. In August, or just before the sap is moving, the stock should be again cut back to the level of the surface. Choose a backward or dormant scion, and shave it down to a wedge shape (see Fig. 5) from the base of a node down the internode; cleave the stock with a strong knife or chisel, and insert the scion down one side of the cleft. If the stock is large enough, two scions may be inserted, one on each side, bringing the inner bark or cambium layers of both stock and scion in exact juxtaposition.” (See Figs. 5, 6, and 7.)

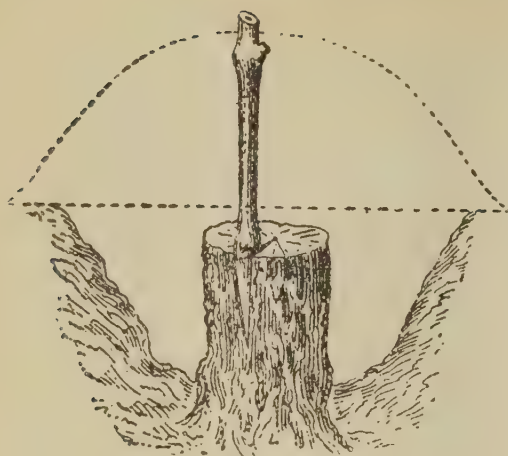


FIG. 6.—Single Cleft Graft.

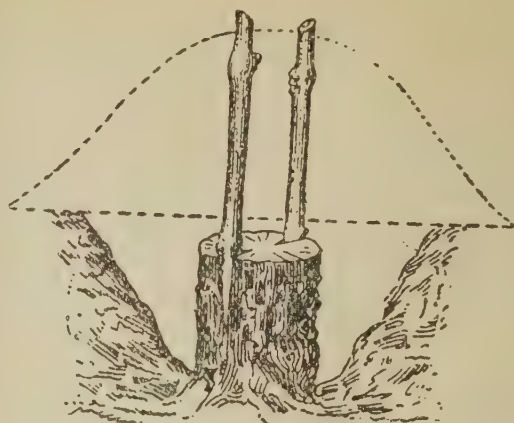


FIG. 7.—Double Cleft Graft.

CULTIVATION.

If the land has been thoroughly prepared in the first place, the subsequent cultivation, once the vines have been planted, is a simple matter, provided it is carried out systematically. Once the vines have been planted, the whole of the ground between the rows, if the vineyard is trellised, or the whole of the ground other than that actually occupied by the vine, if the vines are grown as a bush, must be kept well worked so as to prevent the surface of the soil setting and thus drying out, and also to keep down all weed growth. The first cultivation need not be very deep, but if dry weather sets in the subsequent cultivations must be gradually increased in depth until there is not less than 6 in. of finely worked surface soil. Such a soil mulch will tend to keep the moisture required for the proper development of the vines in the ground for several months, even though there may be no rain in the interval. Cultivation as described is essential in our hotter and drier districts, and provided that there are good winter rains it will insure a sufficient supply of moisture to mature a full crop of fruit. In districts having a better rainfall such deep cultivation is not so necessary; at the same time the land must be cultivated after every rain and the surface kept in a state of proper tilth. Once the crop has been gathered and the wood has thoroughly matured, the cultivations need not be so frequent. At the same time the surface of the soil must be kept from setting, and weed growth must be prevented. After the vines have received their winter pruning the ground should be ploughed deeply, as if the surface roots have been removed as directed there will be no danger of injuring the vines, as all the roots will be out of the way of the plough.

IRRIGATION.

The following remarks apply particularly to vines growing in our dry western country, where suitable water for irrigation is available. If the ground is very dry during the winter it should receive a good soaking after the vines have been pruned, and just before the sap commences to rise in spring. The irrigation should be given by means of furrows between the rows, and enough water should be applied to saturate the whole of the land, as if this is done and the land is cultivated as soon as it can be worked without packing, the moisture can be retained and will probably be sufficient to produce a crop without any further irrigation, or even rain. Winter irrigation when necessary must be thorough, as a partial watering would do little, if any, good. Should

there be a fair winter rainfall followed by a very hot and dry spring, the soil may dry out, or at any rate become so depleted of moisture that the grapes will not swell out properly, and there will be a poor yield in consequence. When there is any danger of this, a good irrigation should be given at the time the grapes are forming their seeds, and this should be followed by systematic cultivation. If this is done no more water will be required. Frequent irrigations are not wanted, and they do more harm than good. Give a good soaking when necessary, and depend on cultivation to keep the moisture in the soil.

RAINFALL IN THE AGRICULTURAL DISTRICTS.

TABLE SHOWING THE AVERAGE RAINFALL FOR THE MONTH OF MAY IN THE AGRICULTURAL DISTRICTS, TOGETHER WITH TOTAL RAINFALLS DURING MAY, 1922, AND 1921, FOR COMPARISON.

Divisions and Stations.	AVERAGE RAINFALL.		TOTAL RAINFALL.		Divisions and Stations.	AVERAGE RAINFALL.		TOTAL RAINFALL.	
	May.	No. of Years' Records.	May, 1922.	May, 1921.		May.	No. of Years' Records.	May, 1922.	May, 1921.
<i>North Coast.</i>					<i>South Coast—continued:</i>				
	In.		In.	In.		In.		In.	In.
Atherton	2.24	21	1.29	2.53	Nambour	5.10	26	5.33	3.78
Cairns	4.75	40	3.91	6.50	Nanango	1.67	40	0.16	1.31
Cardwell	3.83	50	1.34	6.51	Rockhampton ...	1.63	35	0.15	1.25
Cooktown	3.18	46	1.46	2.18	Woodford	3.05	35	1.47	2.34
Herberton	1.80	35	1.16	2.92					
Ingham	3.76	30	1.79	4.20					
Innisfail	13.08	41	9.65	16.87					
Mossman	3.51	14	4.25	5.41					
Townsville	1.43	51	0.23	2.05					
<i>Central Coast.</i>					<i>Darling Downs.</i>				
Ayr	1.28	35	0.53	1.45	Dalby	1.38	52	0.20	1.96
Bowen	1.40	51	0.07	0.99	Emu Vale	1.26	26	0.12	0.98
Charters Towers ...	0.86	40	0.10	1.30	Jimbour	1.27	34	Nil	1.47
Mackay	4.00	51	2.03	1.41	Miles	1.61	37	Nil	1.31
Proserpine	5.45	19	1.66	5.44	Stanthorpe	2.01	49	0.06	3.05
St. Lawrence	1.93	51	0.92	1.61	Toowoomba	2.35	50	0.13	1.23
					Warwick	1.66	57	0.03	0.88
<i>South Coast.</i>					<i>Maranoa.</i>				
Biggenden	1.96	23	0.27	2.73	Roma	1.50	48	0.02	0.59
Bundaberg	2.82	39	0.51	2.04					
Brisbane	2.88	71	2.04	0.76					
Childers	2.42	27	0.50	2.62					
Crohamhurst	5.14	30	3.50	3.91					
Esk	2.16	35	0.31	0.92					
Gayndah	1.63	51	Nil	2.63					
Gympie	3.07	52	1.69	1.59					
Glasshouse M'tains	3.72	14	4.63	1.87					
Kilkivan	2.00	43	0.17	1.18					
Maryborough	3.16	51	1.60	1.96					
					<i>State Farms, &c.</i>				
					Bungeworgorai ...	0.75	8	0.05	0.53
					Gatton College ...	1.91	23	0.02	1.17
					Gindie	1.14	23	Nil	1.44
					Hermitage	1.42	16	Nil	1.06
					Kairi	2.49	8	1.10	3.50
					Sugar Experiment Station, Mackay	3.73	25	...	1.76
					Warren	1.39	8	...	0.94

NOTE.—The averages have been compiled from official data during the periods indicated; but the totals for May this year, and for the same period of 1921, having been compiled from telegraphic reports, are subject to revision.

GEORGE E. BOND,
State Meteorologist.

BUTTER AND CHEESE SHOW.

The year 1921 saw Queensland produce 42,149,352 lb. of butter for export, and 16,016,000 lb. for local consumption, representing a value of £4,845,935.

Cheese factories produced 11,000,000 lb. of that commodity during the same period for export, and 2,000,000 lb. for local consumption, representing a value of £653,956.

Condensed milk production reached the value of £750,000, so that, exclusive of by-products, the dairy industry was worth £6,249,891 to Queensland in 1921.

It is now approaching in importance the sugar industry, the premier agricultural industry in this State.—Hon. W. N. Gillies.

The Minister for Agriculture (Hon. W. N. Gillies), in the course of his inaugural address at the opening of the butter and cheese show conducted at the Exhibition grounds by the Queensland Butter and Cheese Factory Managers' Association on the 22nd June, expressed the belief that Queensland was destined to become the chief dairy produce State in Australia, and provided the foregoing review of the present value of the industry to this community.

Following is an epitome of other points of an important address:—

The value and benefits to the dairying industry, from an educational point of view, arising from the meetings of managers of butter and cheese factories for the purpose of conferring upon questions associated with the manufacture of dairy foodstuffs and the management of factories generally can hardly be over-estimated.

The Department of Agriculture and Stock is always in readiness to assist in co-operating in any educational work that the dairying companies may institute. Further, it is always prepared to give technical instruction on chemical, bacteriological, and similar questions, so far as the dairying industry is concerned.

In addition to the dairy inspectors and graders connected with the Department, there are half a score of officers who are always eager to impart their knowledge to all those interested in the industry.

Mr. R. Winks, senior State grader, who judged the butter exhibits, had described to him the display as the finest he had ever seen, both as regards quality and uniformity of manufacture, and the judge attributed this all-round excellence of quality to the fact that the bulk of the butter on show had been manufactured under the pasteurisation system.

Referring to the announcement of the Minister for Customs on the previous day respecting the much-debated question of grading for export, the Minister expressed a hope that the agreement between the State and Federal authorities would provide for an equitable and amicable adjustment of differences in connection with the points at issue.

The Agent-General (Hon. J. A. Fihelly) had forwarded a communication in which he quoted the view of Mr. M. S. Foley, of Messrs. Foley Bros., that too much unsalted butter was being shipped from Queensland. Mr. Foley contended that not more than 25 per cent. unsalted butter should be despatched to the London market from this State. The Agent-General had then expressed the view that butter would stabilise at about 180s. and remain about that figure until Russia and Germany recommenced trade relations. War glut stocks had been cleared at from 60s. to 80s. per cwt. Recent prices were:—11th May, 164s. to 166s. per cwt.; 20th May, 162s. to 166s.; 3rd June, 158s. to 162s.; 10th June, 170s. to 176s.; 17th June, 192s. to 196s.; 21st June, 208s. to 210s.

Queensland is destined to become the greatest dairy produce area in Australia. We have the climate, the rainfall, and the land, and by applying science and intelligence to the production, manufacture, and sale of the article, this destiny will be fulfilled, provided of course that the purchasing power of the consumers enables them to obtain dairy produce—and not cheap substitutes—and at a price that will make dairying profitable.

Following are the particulars of the judges' opinions of the butters and cheeses entered in the respective competition classes:—

RESULTS.

BUTTER.

EIGHT WEEKS' STORAGE.

	Flavour.	Texture.	Salt.	Colour.	Finish.	Packing.	Total.
Queensland Farmers' Co-op. Ltd. (Booval) ..	54½	20	5	5	5	5	94½
Queensland Farmers (Grantham) ..	54	20	5	5	5	5	94
Oakey Co-op. Ltd. ..	53½	20	5	5	5	5	93½
Wide Bay Co. ..	53	20	5	5	5	5	93
Warwick Butter and Dairy Co. (Allora) ..	53	20	5	5	5	5	93
Downs Co-op. Ltd. (Dalby) ..	53	20	5	5	5	5	93
Queensland Farmers (Boonah) ..	53	20	5	5	5	5	93
Maryborough Co. (Kingaroy) ..	53	20	5	5	5	5	93
Downs Co-op. Co. (Crow's Nest) ..	52½	20	5	5	5	5	92½
Stanley River Co-op. Co. ..	52½	20	5	5	5	5	92½
Nanango Co. ..	52	20	5	5	5	5	92
Downs Co-op. Co. (Toowoomba) ..	52	20	5	5	5	5	92
Warwick Co. (Millhill) ..	52	20	5	5	5	5	92
Caboolture Co. (Pomona) ..	52	20	5	4½	5	5	91½
Caboolture Co. (Eumundi) ..	52	19½	5	4½	5	5	91
South Burnett Co. (Murgon) ..	51½	20	5	4½	5	5	91
Gayndah Co. ..	51½	20	5	4½	5	5	91
Downs Co. (Clifton) ..	51	20	5	4½	5	5	90½
Queensland Farmers (Laidley) ..	50	20	5	5	5	5	90
Port Curtis Co. ..	51	20	5	5	4	5	90
Wide Bay Co. (Gympie) ..	49	20	5	5	5	5	89

30 DAYS' STORAGE.

South Burnett Co. (Murgon) ..	54½	20	5	5	5	5	94½
Queensland Farmers (Booval) ..	54	20	5	5	5	5	94
Queensland Farmers (Grantham) ..	53½	20	5	5	5	5	93½
Queensland Farmers (Boonah) ..	53½	20	5	5	5	5	93½
Warwick Co. (Allora) ..	53½	20	5	5	5	5	93½
Downs Co. (Toowoomba) ..	53½	20	5	5	5	5	93½
Wide Bay Co. (Gympie) ..	53½	20	5	5	5	5	93½
Maryborough Co. (Kingaroy) ..	53	20	5	5	5	5	93
Nanango Co. ..	53	20	5	5	5	5	93
Downs Co. (Crow's Nest) ..	53	20	5	5	5	5	93
Downs Co. (Dalby) ..	53	20	5	5	5	5	93
Stanley River Co. ..	53	20	5	5	5	5	93
Oakey Co. ..	53	20	5	5	5	5	93
Caboolture Co. (Eumundi) ..	52½	20	5	5	5	5	92½
Caboolture Co. (Pomona) ..	53	20	5	4½	5	5	92½
Wide Bay Co. (Cooroy) ..	52	20	5	5	5	5	92
Queensland Farmers (Laidley) ..	52	20	5	5	5	5	92
Warwick Co. (Millhill) ..	52	20	5	5	5	5	92
Downs Co. (Clifton) ..	51	20	5	5	5	5	91
Downs Co. (Miles) ..	51	20	5	5	5	5	91
Gayndah Co. ..	51	20	5	5	5	5	91
Port Curtis Co. ..	51	20	5	5	5	5	91

FRESH.

Queensland Farmers (Laidley) ..	55	20	5	5	5	5	95
Queensland Farmers (Grantham) ..	54½	20	5	5	5	5	94½
Queensland Farmers (Booval) ..	54	20	5	5	5	5	94
Caboolture Co. (Eumundi) ..	54½	20	5	4½	5	5	94
Queensland Farmers (Boonah) ..	54	20	5	5	5	5	94
South Burnett ..	54½	20	5	4½	5	5	94
Warwick Co. (Allora) ..	54	19	5	5	5	5	93
Wide Bay Co. (Gympie) ..	54	19	5	5	5	5	93
Downs Co. (Dalby) ..	54	19½	5	4½	5	5	93
Gayndah Co. ..	53	20	5	4½	5	5	92½
Stanley River Co. ..	53	20	5	4½	5	5	92½
Downs Co. (Crow's Nest) ..	53	20	5	4½	5	5	92½
Maryborough Co. (Kingaroy) ..	53½	19½	5	4½	5	5	92½
Downs Co. (Clifton) ..	52½	19½	5	5	5	5	92
Wide Bay (Cooroy) ..	52½	19½	5	5	5	5	92
Caboolture Co. (Pomona) ..	52½	19½	5	4½	5	5	91½

CHEESE.

TWO EXPORT.

	Flavour.	Texture.	Colour.	Finish.	Total.
Pittsworth Co. (P. Factory) ..	47	25	14½	9	95½
Pittsworth Co. ..	45	25	15	9½	94½
Pittsworth Co. (E. Factory) ..	44	24½	15	9½	93
Downs Co. (Gowrie Junction) ..	43	24½	14½	9½	91½
Woodleigh Cheese Factory ..	43	25	14	9	91
Downs Co. (Jondaryan) ..	42	25	14½	9½	91
Downs Co. (Koondal) ..	43	24½	14	9½	91
MacLagan Valley Co. (No. 1 Factory) ..	43	24	14	9	90
Biddeston Co. ..	42	24½	14½	9	90
Downs Co. (Hodgson Vale) ..	42	24½	14½	9	90
Warwick Co. (Bony Mountain) ..	42	24½	14½	8	89
Warwick Co. (Greymare) ..	42	24½	14	8½	89
Downs Co. (Gowrie Junction) ..	40	24½	14½	9	88

CHEESE—continued.

TWO MEDIUM CHEESES—UNDER ONE MONTH.

	Flavour.	Texture.	Colour.	Finish.	Total
Pittsworth Co.	46	25	15	9½	95½
Merrimac Cheese Factory	45½	25	15	9½	95
Pittsworth Co. (P. Factory)	45	25	14½	9	93½
Biddeston Co.	44	25	15	9	93
Pittsworth Co. (E. Factory)	44	25	15	9	93
MacLagan Valley (No. 2 Factory)	43½	25	14½	9½	92½
Downs Co. (Hodgson Vale)	43	25	15	9½	92½
Downs Co. (Westbrook)	42	25	14½	10	91½
Warwick Co. (Elbow Valley)	42	25	15	9	91
Warwick Co. (Lord John Swamp)	42½	25	14½	8½	90½
Downs Co. (Koondai)	41½	24½	14½	9½	90
Downs Co. (Gowrie Junction)	42	24½	14½	9	90
Warwick Co. (Greymare)	40	24½	14½	9	88
Woodleigh Factory	39	25	15	9	88
Downs Co. (Jondaryan)	41	23½	13½	9½	87½
Warwick Co. (Bony Mountain)	39	24½	14½	9	87

TWO MEDIUM CHEESES—OVER TWO MONTHS.

Downs Co. (Jondaryan)	43½	25	15	10	93½
Pittsworth Co.	44	24½	15	9	92½
Pittsworth Co. (E. Factory)	43½	24½	14½	9	91½
Biddeston Co.	42	25	15	9	91
Woodleigh Factory	43	24½	14½	9	91
Warwick Co. (Elbow Valley)	43½	24	14½	9	91
Downs Co. (Koondai)	42½	24½	14½	9	90½
Merrimac Co.	41½	24½	15	9½	90½
Downs Co. (Westbrook)	41	24½	14½	10	90
Pittsworth Co. (P. Factory)	42	24½	14½	9	90
Warwick Co. (Lord John Swamp)	41½	24½	14½	9½	90
Warwick Co. (Bony Mountain)	41½	24	14½	9	89
Downs Co. (Gowrie Junction)	39	25	15	9½	88½
MacLagan Valley (No. 1 Factory)	40	24	14	9½	87½
Warwick Co. (Greymare)	39	24	14	8½	85½

TWO LOAF CHEESES—UNDER ONE MONTH.

Merrimac Co.	45	25	15	9½	94½
Pittsworth Co.	45	25	14½	9	93½
MacLagan (No. 2 Factory)	43	25	15	10	93
Warwick Co. (Elbow Vale)	44	25	15	8½	92½
Downs Co. (Jondaryan)	43	25	15	9½	92½
Pittsworth Co. (P. Factory)	44½	25	14½	8½	92½
Downs Co. (Westbrook)	42	25	14½	10	91½
Woodleigh Factory	43	25	15	8½	91½
Downs Co. (Gowrie Junction)	42½	25	15	9	91
Warwick Co. (Lord John Swamp)	42	25	15	9	91
Pittsworth Co. (E. Factory)	42	25	15	9	91
Biddeston Co.	42½	25	14	9½	91
George W. Stanley (Rodgers' Creek)	42	25	14½	8½	90
Downs Co. (Koondai)	41	25	14	10	90
Warwick Co. (Bony Mountain)	39	25	15	9	88
Downs Co. (Hodgson Vale)	37	24	15	10	86
Warwick Co. (Greymare)	38	24½	14½	8½	85½

TWO LOAF CHEESES—OVER TWO MONTHS.

Pittsworth Co. (P. Factory)	46	25	15	9	95
Pittsworth Co.	46	25	15	8½	94½
Downs Co. (Jondaryan)	42½	25	15	9½	92
Biddeston Co.	42	25	15	9½	91½
Warwick Co. (Elbow Vale)	43	24½	14½	9	91
George W. Stanley	42½	24½	15	8½	90½
Downs Co. (Koondai)	41½	25	14	9½	90
Warwick Co. (Greymare)	41	25	15	9	90
Warwick Co. (Bony Mountain)	41½	25	14½	9	90
Merrimac Factory	41½	24½	15	9½	90
Pittsworth (E. Factory)	41½	24½	14½	9	89½
Downs Co. (Westbrook)	40	24	15	10	89
Downs Co. (Hodgson's Vale)	40	25	14½	9½	89
Woodleigh Factory	40	24½	14½	9½	88½
Downs Co. (Gowrie Junction)	38½	25	14½	10	88
MacLagan (No. 1 Factory)	40	24	14	9	87
Warwick Co. (Lord John Swamp)	38	24½	14½	8½	85½

THE QUALITY OF EXPORT BUTTER.

Paper read at the Annual Conference of the Queensland Butter and Cheese Factory Managers' Association at Brisbane on the 22nd and 23rd June, 1922, by Mr. E. W. Winks (Senior Grader, Department of Agriculture and Stock).

Going back about thirty years, some of us can call to mind the condition of dairying as it was then carried on in Queensland. The system—if it could be called one—was on a par with that practised by the Turcomans and other more or less nomadic hordes inhabiting the steppes of Western Asia and South-eastern Europe from time immemorial—primitive in the extreme. Cows were milked but once daily. The calves, getting all the richest of the milk, were allowed to run with their mothers during the day time. The cream was collected by gravitation, churned in any old thing from an old-fashioned plunging churn to a milk pail, and the butter worked and washed by hand just as one would knead a batch of dough. Is it to be wondered at that butter thus made (even though in its early stages it was often extremely palatable), owing to want of sufficiently cold wash water and to contact with the hands of the operator, would not keep sweet for more than a few hours? The whole process tended towards working the butter-milk in instead of working it out. Nobody dreamed of an export trade in those days. Queues of us used to line up at the various stores, and we were glad to accept as low as fourpence per lb. for our small parcels of butter. Then a change came.

A few enterprising men, among whom the late Mr. John Reid was the most prominent, and to whom the dairying industry is deeply indebted, made a beginning of what was known as the Proprietary Factory System. Almost simultaneously the then Queensland Government inaugurated the travelling dairy to go from place to place, giving instruction and practical demonstration to all who cared to attend the operations either as students or spectators. The travelling dairy was established ostensibly to teach farmers how to manufacture a uniformly marketable article, but in reality the object was to train dairy folk in handling the raw product at the farm, and thereby pave the way for the co-operative factory system. How it succeeded, the large number of well-equipped factories—both butter and cheese—afford ample evidence.

The separator and steam-driven machinery revolutionised the industry. I shall not weary you much further by recapitulating what nearly everybody now knows, but as the improvement or otherwise of our butter is the main subject of this paper I should like to say this:—One often hears the remark that butter was just as good twenty years ago as it is to-day. Now there is a certain amount of truth in this, but the high-class butter at an earlier period of the industry represented only a small proportion of the total output as compared with the position at the present time, and it is this discrepancy we are trying to reduce as nearly as possible to vanishing point.

For years past we have been gradually increasing the percentage of our first-grade butter, and now that pasteurisation has been adopted by the majority of our manufacturers, the amount of first-grade butter should get a still further uplift. In other countries, pasteurisation has long since got beyond the experimental stage, and experiments conducted by the Department of Agriculture here have only confirmed what in other parts of the world were accepted as established facts. It is in the improvement of the keeping qualities of butter that pasteurisation excels the older method. It also gives a better body, and a texture more free from sponginess and mottle, thus making it carry better. A notable feature of last season's output was the comparatively small amount of "fishy" butter. As to whether or not pasteurisation is responsible for this, it might be premature to offer an opinion.

NINETY-POINT BUTTER.

This much, however, can be said:—That of two lots of butter from the same factory, upon being regraded after being held in cold store for some time, one, the non-pasteurised, was decidedly "fishy," while the other was free from taint. Who can say but that pasteurisation may be the means of minimising, if not completely eliminating, this most objectionable of all taints affecting butter?

A positive menace to the export butter trade to which I would draw attention is the unduly large quantity of so-called 90-point butter—i.e., a butter given full points for body, texture, condition, &c., and only 40 points for flavour. Butter of this description is always deficient in aroma, and rarely "noses" well, and yet to the taste there may be nothing really objectionable. The grader always has misgivings when stamping it first-class, for he feels certain it will not keep. Such butter may be serviceable for immediate use, but it will deteriorate even while in cold store, and after being released thence rapidly goes to pieces. The elimination of a few cans

of doubtful cream might easily make a 90-point butter score 92 points. In the past, when the same price was paid for a first-class butter, irrespective of what it may have scored, there was some excuse for manufacturers to turn out a butter of this class. Their argument was, in effect, that it was more profitable to the factory to get 100 boxes going 90 points than 75 boxes scoring 92 points, when the price per lb. was the same in either case. The present arrangement, to pay according to points value, has improved the situation, yet there is still too great a proportion of this minimum first-grade butter.

With two equally good judges, one might award a butter of this class 90 points while the other might give it 89. If the butter was intended for export, the probabilities are that the latter would be right. For where is the sense in stamping at this end as first-class a butter that it is odds on will turn out other than first-grade when opened up in London.

SHORT WEIGHTS.

The Regulations in connection with short weights were framed chiefly for the prevention of the practice of packing dairy produce at a weight less than that stated in the trade description—a custom somewhat prevalent in the past. In all the cases coming under my notice, however, during the past three or four years, I do not believe that there was one of actual dishonesty. Carelessness there may have been. Frequently boxes of butter containing $58\frac{1}{2}$ lb. and 59 lb. have been met with, while one actually tipped the beam at 60 lb. net. It has often happened that after a manufacturer had been penalised for putting up short-weight butter, he got the “wind up” and rushed to the opposite extreme. In a recent case a defaulting factory, to be on the safe side, submitted for examination two consignments amounting to 462 boxes, ten of which, taken at random from the grading floor, scaled on an average $57\frac{1}{2}$ lb. net. The amount of butter (over ten boxes) given away in this one instance would have gone a long way towards purchasing a thoroughly accurate weighing-machine. This is by no means an isolated case. The main points in avoiding incorrect weights are a good scales and a reliable man to do the weighing; put $56\frac{1}{4}$ lb. of butter into each box, ramming the corners well. Stamp every box “bare weight.” Then there is a quarter of a pound of butter to come and go on, should there be any shrinkage owing to the escape of free moisture. Then, provided the net weight does not fall below that given in the trade description, the factory is safe.

FAULTY PACKING.

Notice of defects in packing is often omitted from the grading memos., owing to the fact that they are frequently filled in before the butter is stripped. Besides, it is impossible for the graders to superintend the weighing of every box. The principal defect is in the butter not being packed into the corners of the box, making the cube irregular in shape and increasing the risk of contamination.

CONCLUSION.

As already mentioned, taken as a whole, the percentage of first-grade butter last season has perceptibly increased—a fact in which pasteurisation, beyond doubt, was a big factor.

Given favourable seasons, there is no question about the increased output. The first obstacles have been cleared, and though some yet have to be negotiated, things are moving in the right direction. I recollect when the manager of the travelling dairy advocated milking twice daily, nine out of ten of the young men addressed (and they were not schemers either) retorted “Milk twice a day! No, not for Father Peter!” with an emphasis that bespoke sincerity. Many of these young fellows are among the staunchest of factory suppliers to-day. Who knows but that in the not distant future rugging of cows when exposed to extreme weather conditions, when half the food they eat goes to keep up the heat of their bodies at the expense of the milk yield, provision for winter feed, thereby regulating the winter and summer supply of our dairy produce so that the bulk of it does not arrive in oversea markets at one particular period of the year, and other innovations described by the unthinking as the ravings of theorists, may be the rule instead of the exception, as at present? Quite recently I received a letter from a man in London who is in touch with the butter trade there, in which he informed me that millions sterling was being invested in Holland alone in improving their butter, which means another formidable competitor in the London market. Quality, therefore, every time and all the time, should be the slogan of our dairymen.

The opening up for closer settlement of the Upper Burnett, where there is a large area of ideal dairying country, will add enormously to the total output of our factories, and, unquestionably, will help to place Queensland ahead of any other State in the Commonwealth in the production of butter and cheese—a position to which her natural advantages entitle her.

THE SUMMER FALLOW.

As the underlying principles governing the preparation and cleanliness of land for cropping in Canada are applicable to other countries, the subjoined reprint from the March issue of "Seasonable Hints," issued by the Dominion Experimental Farms Authorities, Ottawa, has been made for the readers of this Journal:—

Under average western conditions, the summer-fallow must be regarded as a necessary evil. Years of experience have proved that a good summer-fallow is the foundation for good crops. The advantages of the fallow are that it cleans the land of grasses and weeds, stores and conserves moisture, renders plant food readily available, and leaves the land in excellent condition for early spring seeding. The disadvantages are that it is expensive, requiring much labour and the loss of a year's crop; it is wasteful of fertility, as often too much plant food is rendered available; it rapidly reduces the humus and vegetable fibre in the soil with resultant soil drifting.

For seven years an experiment has been conducted at the Lacombe Experimental Station in which, annually, seventeen different methods of summer-fallow treatment have been applied in order to obtain data as to the best methods of ploughing and cultivating the fallow. Some of the methods tried have been previous fall cultivation, shallow fall ploughing, different times and depths of ploughing, once and twice ploughing, different methods of cultivation after ploughing, and growing a forage crop on the fallow. The effects on the condition of the soil and the crop yields for two seasons following have been recorded. The deductions from these 119 tests are summarised in the following paragraphs:—

The two main objects of the summer-fallow are to kill weeds and store moisture, and, fortunately, both objects are attained by the same methods. Cultivation of the land to be fallowed should start at cutting time the previous year. If the binder is followed by the disc, moisture will be stored and many weed seeds will germinate and be killed by frost. If possible, this disced land should be harrowed early in the following spring. This will prevent evaporation and start a second crop of weed seeds growing. When the land is very dirty it should again be cultivated or disced immediately after spring seeding, as this will kill the growing weeds and start a new growth. All of this means work, but much of the labour will be saved when the fallow is ploughed, as it will be found that the soil contains much more moisture than a fallow not cultivated, and that the land ploughs very much more easily. *One standard rule should be to get the fallow ploughed early, and by the end of June at the latest.* The average results of the seven-year tests show an increased yield of wheat of 5 bushels 31 lb. from land ploughed on 15th May over land ploughed on 15th July. May ploughing is seldom practicable, but the fallow should be ploughed as early as possible after seeding. If the land is badly infested with weeds, particularly couch grass, it may be necessary to plough the land twice, but twice ploughing invariably reduces the yield of wheat. If the land must be ploughed twice, the first ploughing should be early and shallow, about 4 in. deep, with the second ploughing done as early in the summer as possible, and about 2 in. deeper than the first ploughing. The largest yields have been produced from land ploughed once and 5 or 6 in. deep. In heavy clay soils, deep ploughing may at times be necessary to break up a hard pan left by the plough. In some districts the custom is to manure the land previous to summer fallowing, but this is seldom good practice. Fallowed land usually has a surplus of available fertility, and better returns from the manure will be secured if it is applied on the first-year stubble and immediately ploughed in. After the land has been ploughed it should at once be packed or cultivated to break it down and prevent evaporation. When a good seed bed has been secured the land should be given cultivation only as required to kill grass or weeds. Too frequent cultivation, particularly with the disc, will cause drifting. The disc is good for breaking down sods and lumps, and acts as a packer; but for killing weeds and preventing drifting the duckfoot cultivator is very much more satisfactory.

The rule in many parts of the West, particularly in the drier areas, has been to summer-fallow every third year, but it is yearly becoming more evident that methods must be adopted to avoid such frequent fallowing. Soil drifting, caused mainly by too frequent fallowing and the resultant depletion of vegetable fibre in the soil, is now in many parts as great a problem as moisture supply. Many experiments with summer-fallow substitutes are now underway, but for the drier areas the adoption of longer rotations in which more grass crops are grown seems a much surer method. Cultivation after the binder will do much to help the moisture supply, but nothing has yet been discovered to equal the bare fallow as a method of killing weeds and storing moisture. The bare fallow is so expensive that nothing should be allowed to prevent the work being properly done. A good fallow ensures two good crops, but to plough a fallow after the weeds have pumped all the moisture out of the soil and dropped a heavy crop of seeds is to ensure crop failure for two or three years.

[NOTE.—The seasons in Canada are the reverse of our Queensland seasons, and allowances must be made for climatic differences.—Ed.]

STOCK BREEDING.

The May issue of the "Journal of the Victorian Department of Agriculture" contains a very interesting and instructive paper, which is well worthy of the attention of dairy farmers in Queensland, entitled "Hints to Beginners," by J. S. McFadzean, Senior Dairy Supervisor. The paper, which was read at the Annual Convention of the Chamber of Agriculture, held at Horsham, 6th April, 1922, reads as follows:—

VALUE OF PURE BREEDING.

To increase the productiveness of the farm should be the principal aim of every man on the land. Nearly every farmer is a raiser of stock of some variety; and stock and stock products constitute a very large proportion of agricultural production. Higher-priced land, higher rates of interest, higher cost of living, and higher-priced labour make it most essential that everything possible must be done to increase the acre production, in order to show a profit on the work of the farm. Well-bred stock cost no more to feed and care for than inferior animals, but they bring in much more money. Well-bred sheep cut more wool and make better mutton than those of mixed breeding. A herd of pure-bred cattle will bring in better returns than cross-breds, whether for beef or dairy produce. In fact, for every utility a more even quality and more remunerative class of stock is obtainable by pure breeding than by crossing. If none but pure-bred sires were used in every line of stock-breeding, the acre production of every farm would be greatly increased; therefore, all matings made should be on the line of preserving purity of blood rather than cross-breeding.

BREED SPOILING.

Every farmer has not the ambition to become a breeder of stud stock. Very few indeed have that natural aptitude for the work which is essential to success; but this is no reason why those who are not stud breeders should persistently spoil the work of those who are. Australia possesses some of the most able stock-breeders in the world, who have done much to improve the breeds they are working with; but they are unfortunately surrounded by thousands of other stock-raisers who, by crossing and mixing up of both strains and breeds, are keeping the general quality of farm animals down to a very low level.

AN UNWARRANTED PREJUDICE.

Carelessness, want of thought, and want of knowledge all contribute to this unfortunate condition in agriculture; but an unaccountable prejudice against close breeding is responsible for the great amount of cross-breeding that is done. That such prejudice is able to exist is due to the fact that many people will accept the questionable statements of others rather than the definite evidence by which they are surrounded. The plain fact is, that all good quality which is present in domestic stock has been fixed there by close breeding, and all deterioration has resulted from indiscriminate crossing. There has, however, of late years, been a gradual change in regard to this subject in the minds of stock raisers. The advantages of higher grade animals are becoming more widely recognised each year, and more pure sires are being used. The younger generation of farmers includes a larger percentage of breeders of pure stock than were to be found thirty years ago; but the prejudice against close breeding is still sufficiently strong and widespread to seriously interfere with progress; and, until that is changed, advancement in stock raising will not be general.

BLOOD RELATIONSHIP ESSENTIAL.

The hackneyed phrase, "Like produces like," is used by almost every one who endeavours to explain the laws of breeding; and is intended to convey the idea that the parent stock must have characteristics in common, if similar features are to be reproduced in the progeny. But most of those who use the term overlook the fact that a likeness such as is essential to this reproduction does not often exist between a male and female unless they are related in some way. A true likeness usually indicates blood relationship. In very rare instances would the direct offspring be found to reproduce features which the parents had in common, unless blood relationship existed between them.

CLOSE BREEDING IN NATURE.

Those who declaim against close breeding base their whole opposition to it on the grounds that it leads to constitutional weakness; yet all round us in nature close breeding is the rule, and has been the rule for all time. Every variety and sub-variety of animal, bird, reptile, or insect breeds close, otherwise they would not

exist in varieties as we find them. Cross-breeding is not followed in nature; and no line of study on any species of stock can be carried on without accepting the fact that it owes its existence solely to close mating.

AN HISTORICAL EXAMPLE.

The earliest records of stock-breeding furnish evidence that this was recognised when our present breeds of domestic cattle were being perfected. The history of the British Shorthorn shows that the perfection of that breed in the year 1810 was the bull 'Comet.' This bull resulted from the successive matings of, first the bull 'Bolingbroke' with the cow 'Phoenix,' which were both sired by 'Foljambe'; then their son 'Favourite' was mated back to his dam 'Phoenix,' and the heifer 'Young Phoenix' resulted; and 'Comet' was a calf from 'Young Phoenix' by her own sire 'Favourite.' This bull was sold for 1,000 guineas, and is one of the foundation stock of the present-day Shorthorn. That this was not haphazard mating is seen from the mention that the Collings Brothers, who bred 'Comet' and many other high class Shorthorns, learned their business from the older breeder, Robert Bakewell, whose name is honoured as one of the founders of both Shorthorn cattle and British long-wool sheep. But it should not require any modern evidence to convince one who gives this subject serious thought, that it would be impossible for any breed of animal to have been perfected without close breeding; and it follows that what will make a breed, cannot be considered as tending to destroy it. Further, we come at once back to the fact that all cross-breeding which has been carried out by thousands of stock raisers since the time of Collings Brothers, has produced nothing but inferior stock.

Scrutiny of the pedigree of the present-day thorough-bred horse also brings overwhelming evidence of the success of close breeding; for in speed and stamina these stock give no suggestion of deterioration. Pedigrees of pure-bred sheep and dairy cattle also show that perfection in the flocks and herds of to-day has been maintained by close breeding—the whole of the evidence on this subject being strong in support of preserving a close blood relationship, and against cross-breeding.

GRADING UP.

This brings us back to where mention was made of the widespread loss which has resulted from cross-breeding. Bulls of unknown breeding—the outcome of repeated indiscriminate crosses of various breeds—are being used by many people who raise stock; and the progeny are invariably a grade worse than the parents. Where pure-bred sires are used the progeny shows improvement. Where pure-bred sires of one strain only are used successively, the improvement is still more marked. Still further progress is made where there is rigid selection of the females for each year's matings; and when such selection is followed by the breeding of an improved sire back to his own progeny, the offspring more quickly shows the desired quality.

CONSTITUTIONAL FITNESS.

The one thing which has to be borne in mind is that close breeding is not a system in itself. In nature close breeding is always accompanied by natural selection of the parent stock on the basis of stamina. Such selection is made as the result of fighting amongst the males at the mating season; and through all weakly animals succumbing to the stress of seasons, or the attacks of other animals or reptiles which are natural enemies of their species. Nature allows for selection by strength of constitution; and selection must be fully as rigid in all stock-breeding work by man. A weakling or faulty animal must not be used, or the weakness or fault will be intensified in the progeny by close breeding, just as strength and soundness is similarly reproduced. Close breeding, to be fully satisfactory, must always be accompanied by judicious selection on soundness of constitution.

APTITUDE FOR THE WORK.

No study of systems of breeding will, however, make into successful stud breeders, those who have not the natural aptitude for the work. Unless the farmer is fortunate enough to be born with the faculty of discriminating closely in regard to excellence in high-class animals, he will be well advised not to attempt special stud breeding; but to content himself by working under the advice of some one whose ability as a breeder has been proved, and who will direct as to both culling and mating. Many people who are not capable of doing this work themselves, are most diffident in acknowledging it, and they lose money in consequence. Natural aptitude combined with early training and experience qualifies for this work of stock selection, just as experts are made in any other profession; and those less fortunate should not hesitate to purchase their advice exactly as they would on a subject of law or medicine. The successful stock-breeder is the one most competent to be the adviser of others; and the latter would profit most by the arrangement.

STANDARD TYPE THE BASIS.

In all matings the basis of selection should be on standard show type. Every breed which has any claim to popularity, has been developed for utility purposes, and, in the breeding of these, symmetry and beauty of outline as well as soundness of constitution have been attained. The result, as shown in the high-class animals of each breed, is thus the work of several generations of breeders, each following up and improving where possible, on the work of those preceding; and all stock raisers should aim at maintaining those lines of excellence. In the perfection of symmetry of outline there has been no loss of utility quality; but rather there has been definite gain almost everywhere. More even production (and on a higher grade) is now obtainable from pure-bred stock than at any former period, and no better reason is required for the maintenance of standard type.

EXCLUSIVE STRAIN.

One thing, however, must be borne in mind by all those who raise stock, and this is that many strains of breeds are almost as distinct from others as though they were separate breeds; and, therefore, the crossing of these may give very unsatisfactory results. Where a strain of any breed has been established over a number of years a blood relationship will exist amongst the stock which may not blend well with that of another strain which has kept equally distant throughout its several generations. For this reason it is advisable that the purchase of sires be made on one line of breeding; so that, by continuing the line established by the stud breeder, the farmer or grazier may participate in whatever good results the breeder obtains.

HOW BEST TO WORK.

In conclusion, pure blood lines make for perfection in stock. The repeated mating of pure sires to cross-bred or grade stock will most quickly improve the quality of these latter when the sires used in succession are related. The mating of a selected sire to selected females of his own progeny is more certain to be beneficial than otherwise. The mixing of breeds is a destructive policy; while the crossing of strains should only be attempted under the guidance of expert advice. Increased acre production from stock raising is certain to result from the consistent use of a line of pure-bred sires, and success will be most marked when following closely in the direction advocated.

CANE PEST COMBAT AND CONTROL.

The General Superintendent of the Bureau of Sugar Experiment Stations has received the following report from Mr. Edmund Jarvis, Entomologist, who is stationed at Meringa, near Cairns:—

“CONDITION OF CANE CROPS.

“About the middle of last month (15th to 26th April) a nice fall of rain (6.13 in.) relieved a situation which, to many cane-farmers, was becoming increasingly serious. In my report for November last it was mentioned that beetles had appeared here in alarming numbers during the 1920-21 season, but that, fortunately, prolonged wet conditions had enabled the cane to attain to a good length before grubs became large enough to do much damage. Although present in considerable force, showers and cloudy days during the critical period kept the tops green, and sticks that had fallen were able to root afresh and so keep alive until crushing time.

“As foretold in the abovementioned report, beetles were very much in evidence again this year (1921-2), and being unchecked by any collecting, have succeeded in spreading farther afield and injuring cane in various localities which up to the present have been comparatively free from the pest.

“On some of the blocks at Greenhills the cane was completely destroyed, in spite of a favourable wet season, at a time when grubs were still in their second instar (half grown); showing the severity of the present infestation. Had dry conditions continued during the past six weeks, many growers would have lost heavily; but it is to be hoped that the recent rainfall, and an additional precipitation of 1.23 in. (30th April to 4th May) may tide us over the worst period of grub activity.

“COLLECTING AT GREENHILLS IN THE PAST.

“Desiring to learn something of the methods of cultivation and grub control practised at Greenhills in the early days of cane-growing, we have got into touch with a previous owner, who tells me that while at Greenhills he planted about 1 ft. deep,

and, on the whole, obtained fair crops. It seems that he tried 'moth-balls' when planting, but without success; so that his field experiments with this form of naphthalene gave similar results to those obtained recently at our laboratory (see March Report, 1922). Beetles were systematically collected and destroyed by him, this being apparently the only artificial control method that yielded beneficial results. He is of opinion that when early thunderstorms are followed by one week of continuous rain, there will be plenty of grubs the following year, but that if one or two days of wet be succeeded by dry weather lasting from four to six weeks, there will be fewer grubs.

"This information regarding the influence of climatic conditions as a controlling factor during the period of oviposition may prove to be of decided economic value, as it is only by such observations, extending over many years, that we can hope to acquire definite knowledge respecting various phases of natural control, and so be in a position at the end of the fighting season to form an approximate estimate of the probable strength of the enemy.

"CANE H.146 AT RIVERSTONE.

"A sample of this variety, which is credited with being practically immune from attack by the weevil-borer (*Rhabdoenemis obscura* Boisd.), was obtained last year from South Johnstone Experiment Station, and a row about 3 chains long, planted on 24th September at Riverstone, near Gordonvale, on land where the borer had proved troublesome the previous season. The sets had lost a good many buds during transit, so unfortunately there were many misses.

"When examined on 25th instant (eight months later) the result of this experiment was seen to be very encouraging, the canes in stools of H.146 being much longer, stouter, and of more vigorous appearance than those in adjoining rows of D.1135.

"Apparently this new cane is going to suit the district, and although resembling the latter variety in general habit of growth, possesses the following additional advantages:—The c.e.s. is 15.54, or 1.04 higher than D.1135, and the canes are stouter and longer. This promising variety, which was introduced into Queensland from Hawaii by the Bureau of Sugar Experiment Stations a few years ago, is a medium stout, olive-green cane, with slight black wax, eyes large and flat, internodes to 5 in., zig-zag appearance, habit erect, foliage thin and sparse, resembles D.1135 in growth, good striker and ratooner, rapid grower, practically self-trasher. Age, 11 months; fibre, 11.5; density of juice (Brix. 21.2). (D.1135 = age, 11 months; Brix., 19.03; fibre, 11.00). Its grub-resisting qualities have not been determined, but in all probability it should be equally if not more resistant than D.1135.

"EXPERIMENT PLOTS AT MERINGA.

"The plots at 'Carrah,' which had been treated between the dates 12th November to 8th December were inspected early this month (May).

"The various insecticidal substances applied to the surface of the soil, with a view to inducing beetles to avoid ovipositing in the treated areas, were naphthalene, chloride of lime, coal-tar, tobacco dust, and carbolineum emulsion, the size of each plot being one-eighth of an acre. The method of application, and the enduring qualities of the odours arising from these deterrents, were mentioned in the report for December, 1921.

"At the present time (6th May) the cane both on treated and check plots looks about the same in height and general appearance; and grubs, although present, have not yet done sufficient damage to enable one to form an opinion as to the results of the experiments. In about a month's time, however, after grubs have ceased feeding, it may be possible to arrive at a definite conclusion.

"TRAP-TREES FOR CANE BEETLES.

"In 1896 the 'Australian Sugar Journal' made mention of a certain tree growing at Mackay that for two years in succession had been crowded with cane-beetles, which, after feeding on the foliage, fell to the ground in a sort of paralysed condition and then died. Being anxious to test the killing properties of this tree (a variety of *Per-simmon*) inquiries were made last October, with the result that the owner (Mr. James Croker) very kindly forwarded a number of suckers, taken from the identical tree mentioned, to this Experiment Station; and later on (4th May) was interested enough in our work to follow up this with three fruits from the same tree, so that seeds have now been obtained and planted here. Two of the suckers are growing, but have not, so far, made much headway. Probably the seedlings, which will not receive any check, may make a more rapid growth. In any case, by the time the next lot of beetles emerge there should be enough leaves on the suckers to enable us to test the value of this plant as a possible trap-tree in our district.

“TACHINID-FLY PARASITES.

“Breeding operations are now under way at the Laboratory, and the first lot of flies, from which we intend getting up our stock for liberation by rearing successive broods, have been obtained from the Riverstone district, where twenty-five specimens were let go last December among bored cane belonging to Mr. G. Alley. This cane, by the way, which was considered to be too badly infested to be worth cutting, has now been cleaned up by the parasites, the result being a fine healthy-looking crop of badila which harbours very few cane-borers. Pupæ of the tachinids were obtained from cane sticks in the field twenty-four days after liberation, and flies belonging to the first brood emerged from these pupæ on 22nd January (exactly five weeks after the first introduction).

“Judging by the above results, December appears to be a good month in which to liberate tachinid parasites, as at this time of the year flies from the first brood, emerging early the following month, have time to enter upon the second brood before the wet season commences, and the *Empusa* fungus parasite of this fly makes its appearance.

“The flies resulting from this second brood about the middle of February, having by that time run into four figures, should then have a good chance of becoming permanently established.

“Growers who visit the Meringa Laboratory during the next few months would be able to see these parasites breeding in confinement, and also the life-cycle stages of our digger-wasps, from the egg, which is laid on the body of the paralysed cane-grub, to the maggot, cocoon, and finally the imago or perfect insect.”

A MANGOSTEEN FROM NORTH QUEENSLAND.

By C. T. WHITE, Government Botanist.

When in North Queensland recently in search for seeds of two native trees (*Garcinia Mestoni* and *Citrus inodora*), I was informed that a tree of the former was growing in an old garden at Edge Hill, near Cairns. Fruiting specimens of this tree have since been sent me by Mr. W. J. Ross, Instructor in Fruit Culture at Cairns, and they prove to be not the native mangosteen, but an Indian species (*Garcinia Xanthochymus*) cultivated sometimes in North Queensland.

The tree has been confused in North Queensland with the ordinary true mangosteen (*Garcinia Mangostana*), supposed to be one of the most delicious of tropical fruits; but the only tree we actually know of that species is one at the old Kamerunga State Nursery. The present plant was figured and described from Port Douglas as the true mangosteen in the pages of the “Queensland Agricultural Journal” for December, 1910; and another specimen at the same time from the Burdekin Delta was described as *Garcinia cornea*. So it is seen that the tree has been confused a good deal in the past.

Garcinia Xanthochymus (synonym *Xanthochymus pictorius*) is a native of India. The large ripe yellow-fruits form an inferior sort of mangosteen. Roxburgh, a well-known writer on Indian plants, states that the green but well-grown fruits yield a bright-yellow juice, which when dried makes a very good gamboge water-colour, either by itself as a yellow or with others to form a green.

The fruit is easily told from that of the true mangosteen and from that of *Meston's* mangosteen by its pointed (not flat) top.

Mr. E. W. Bick, of the Botanic Gardens, informs me that the tree was grown at the Acclimatisation Society's Garden at Bowen Park some years ago, but could only be grown indoors, for as far south as Brisbane the winters prove too severe for it.

The name *Xanthochymus* comes from the Greek *Xanthos* yellow and *chyma* juice—from the yellow juice exuded by the fruits. The genus *Garcinia* is named in honour of a French botanist (Laurent Garcin), who travelled a good deal in the East Indies.



PLATE I.—MANGOSTEENS ON THE BURDEKIN DELTA, N.Q.

NAMBOUR RURAL SCHOOL—A FLOURISHING INSTITUTION.

Since its establishment, over 800 students from the North Coast districts have received sound technical instruction at the Nambour Rural School. These boys and girls to-day are taking their places on the farms and in the homes, and are proving in a practical manner the value of the instruction imparted at an institution that is an ornament to the educational system of the State and a monument to the faith and foresight of its founders.

The first impressions of a visitor to the Nambour Rural School are of his entrance into a hive of industry; of an assemblage of young Queenslanders of fine physique, keen intelligence, and excellent training; of a staff capable, enthusiastic, and right-down on the job of turning out boys and girls who, in the ordinary course, must naturally be numbered among the State's best citizens.

This school was established as an experiment, and has proved a huge success. In August, 1915, the then Minister for Education, Hon. H. F. Hardacre, announced the intention of his Department to establish a rural school, and Nambour, it was considered, offered special advantages on account of its central position on the North Coast. In addition to ordinary instructional purposes, the school was intended for advanced boys who desired to specialise in agricultural subjects, and for girls who wished for tuition on the domestic side of farm life. The details of the scheme were worked out by the then Under Secretary, Mr. J. D. Story, and early in 1916 a third wing to the existing State school and an economically constructed workshop were provided for the accommodation of the technical students.

In January, 1917, the school was opened, under the charge of Mr. T. G. Fisher, now head master of Townsville West. There followed immediately an influx of boys and girls from the several centres along the North Coast line, extending from Petrie, in the south, to Tandur, in the north. Free railway tickets were issued to all students under the age of 18 years to enable them to attend. Such has been the success of the school that over 800 students from the North Coast districts have received technical instruction since its inception. These boys and girls to-day are taking their places on the farms and in the home, and are proving, in a practical way, the value of scientific and technical training for the farmers of the future. Though technical instruction is the main feature of the curriculum in the senior school, academic phases of primary and secondary education have not been lost to view. This is proved by the excellent results annually obtained by the students in examinations for State scholarships and high schools. In the words of Mr. J. D. Story, at a farewell function to Mr. Fisher in 1919, "The school's academic record is as good as any in Queensland." Agricultural science, milk- and cream-testing, beekeeping, poultry-keeping, wood work, tin work, leather work, and blacksmithing are among the subjects taught in the ordinary daily course, while evening classes in dressmaking, wood work, and commercial subjects have become an important regular feature of the school's technical activities.

For field instruction, visits are regularly made to the demonstration plots at Woombye State school and to surrounding farms and orchards. An officer of the Agricultural Department lectures regularly on fruit culture, and this would appear to be the first step towards co-operation in agricultural education between the two departments, as outlined in the new agricultural policy.

The girls are taught cookery, fruit-preserving, pickling, jam-making, confectionery, dressmaking, millinery, and laundry work. The popularity of these classes may be judged by the fact that dressmaking alone attracts an average of one hundred students each term.

On the athletic side the school is rapidly gaining fame. Teams in football, swimming, cricket, tennis, and basket-ball enter into their games with an enviable enthusiasm, which is inspired and maintained by an able staff of teachers under Mr. R. W. M. Steele, who succeeded Mr. Fisher in 1919.

At a garden fete on 27th May, opened by the Minister for Education, Hon. John Huxham, and at which every district centre was represented, finely finished samples of the students' work were exhibited, and their tradesmanlike excellence called forth much commendatory comment.

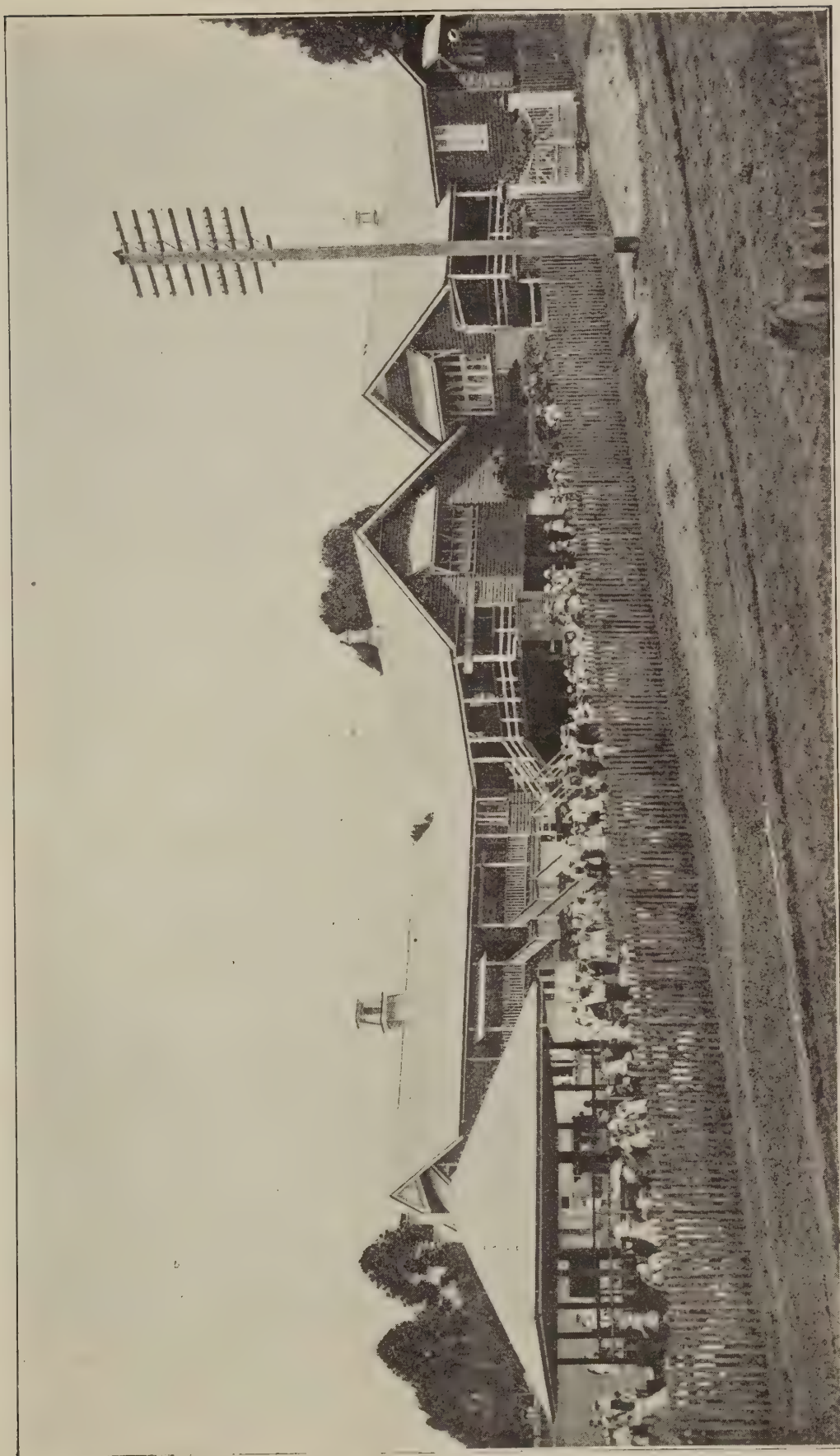


PLATE 2.—JUNIOR CLASSES AT PLAY, NAMBOUR RURAL SCHOOL. FRONT VIEW.

Photo: Murray Studios.



Photo: Murray Studios.

PLATE 3.—DISPLAY OF CLUB SWINGING BY NAMBOUR RURAL SCHOOL GIRLS
AT GARDEN FETE, 27th MAY, 1922.



Photo: Murray Studios.

PLATE 4.—NAMBOUR RURAL SCHOOL FOOTBALL TEAM.

SCIENCE NOTES.

BY EDMUND JARVIS, Entomologist.

Under this heading it is proposed to record each month discoveries and observations made at our laboratory relating to insect pests of sugar-cane and their parasites which are likely to prove of general scientific interest.

EARLY STAGES OF *MACROSIAGON (EMENADIA) CUCULLATA*, MACL.

A hyperparasite of the above genus—viz., *M. pictipennis*, Lea.—has during the past seven years been considered an enemy of our useful digger-wasp parasites, *Campsomeris tasmaniensis*, Sauss., and *C. radula*, Fabr.; having been found from time to time in cocoons of these scoliids collected in the field.

Nothing, however, was known respecting the life-cycle of these remarkable beetles until quite recently (December, 1921), when Mr. W. Cottrell Dormer, Assistant Entomologist, had the good fortune to observe specimens of *cucullata* in the act of ovipositing on the under-surface of leaves of *Ficus opposita* and *Urena lobata*.

The eggs, which are white and of elliptical form, and measure 0.156 by 0.45 m.m., numbered a hundred or more, and were placed close together but without definite arrangement amongst the hairs of the leaf, distributed over an area of about 1 to 2 square inches.

During the period occupied by the egg-stage they were kept under quite dry conditions in glass tubes, and a fortnight later had commenced to darken, becoming black, and finally hatching after 17½ days.

The minute and active triungulin (representing the first larval stage) resembles in general appearance and structure that of a closely related European species (*Rhipiphorus paradoxus*), and, like that insect, probably makes its way into flowers visited by hymenoptera, in the hope of attaching itself to some suitable wasp and being carried into its nest.

A *Campsomeris* wasp was placed by us for a few seconds in a large test-tube containing about 25 triungulins, and then immediately put under chloroform. Examination revealed numbers of these curious larvæ tightly embracing various hairs on the tarsi, clypeus, neck, pronotum, &c., of the digger-wasp. Even in so brief a space of time, and while the wasp was in active motion, they had contrived to jump upon or lay hold of it, and securely attach themselves.

Upon the latter reviving and discovering the presence of its minute enemies, it endeavoured to brush them off, but only succeeded in killing one and removing two others.

Subsequently these triungulins were carried underground by the host, and after oviposition had taken place one of them remained on an egg attached to the paralysed grub for three days, making no attempt to pierce the chorion, but apparently awaiting the appearance of the maggot of the wasp.

Unfortunately, this egg, being injured by an acarid, did not hatch, so we lost the opportunity of observing the behaviour of this hyperparasite towards the very young scoliid maggot.

In all probability its first larval instar, like that of *Rhipiphorus*, is passed inside the maggot of the digger-wasp.

This triungulin, which is figured on the accompanying plate, is a black and almost microscopic insect, barely visible to the naked eye, measuring 0.53 by 0.213 m.m., greatest body length and width; and 0.695 m.m. from front of head to end of anal bristles. By aid of a sucker situated ventrally on the anal segment it is able, when necessary, to stand on its tail, thus leaving all legs free when about to lay hold of insects to be used as carriers.

It appears likely that almost any nectar-loving species of hymenoptera or diptera, irrespective of size or economy, might be made use of by the triungulin, and in this way serve to transport it from flower to flower until its carrier chanced to alight on blossoms habitually visited by scoliid or other burrowing wasps, some of which might prove to be suitable hosts.

I may mention that the leaves of *Urena lobata*, on which eggs of *M. cucullata* are deposited, are glandiferous, two or three cup-like honey-bearing glands being situated on the edge of the leaf, close to the petiole. Perhaps the beetle purposely selects such leaves in order that her offspring may find nourishment prior to commencing their travels, and at the same time be afforded a better chance of meeting with insect carriers in the shape of small flies, &c., which might be attracted to leaves bearing glands of this nature.



Photo. by E. Jarvis.]

PLATE 5.—*CAMPSOMERIS TASMANIENSIS* Sauss., AND *C. RADULA* Fabr.,
TOGETHER WITH THEIR HYPERPARASITES AND HOST-GRUBS.

(About two-thirds natural size.)

- 1.—*C. tasmaniensis* (female).
- 2.—*C. tasmaniensis* (male).
- 3.—*C. radula* Fabr. (female).
- 4.—*Macrosiagon pictipennis* Lea. (hyperparasitic).
- 5.—*Hyperalonia satyrus* Fabr. (*funesta* Walker).
- 6.—Grub of *Lepidoderma albohirtum* Waterh.
- 7.—Grub of *Lepidiota frenchi* Blackb.
- 8.—Grub of *Lepidiota caudata* Blackb.
- 9.—Grub of *Lepidiota rothei* Blackb.
- 10.—Grub of *Anoplognathus boisduvali* Boisd.
- 11.—Grub of *Dasgynathus australis-dejeani* Macl.

Note.—The grubs were photographed from spirit specimens, and are somewhat shrunken.

The continuous supply of food furnished by these various root-eating Scarabaeidæ, coupled with the fact of our average temperature during autumn and winter being about 73 degrees Fahr., enables species of *Campsomeris* to breed unceasingly and produce successive generations about every three months.

The lowest temperature recorded by the writer at Meringa during 1919, was 40 degrees Fahr. at 6.30 a.m.; and a few hours later, at 11 a.m., the morning being sunny, plenty of female digger-wasps were seen flying to blossoms of *Sida acuta* and *retusa*.

Grubs nearing the end of the second instar appear to be readily victimised by these scoliids. We have many records, for instance, of wasps of average size ovipositing on small second-stage *Lepidiota frenchi*; and conversely of females below the average size, parasitising big third-stage grubs of *L. albohirtum*.

Such readiness to oviposit on any host-grubs chancing to be available, whether large or small, while naturally enhancing the economic value of these scoliid wasps in Queensland, would add greatly to their usefulness in other countries into which they might be introduced as possible controlling agents against root-eating scarabæid grubs.

The larval stage of the six hosts enumerated above occurs in the Cairns district during the following periods:—*L. albohirtum*, plentifully, from February to July; *D. australis-dejeani*, commonly, from January to May; *L. rothei*, locally plentiful from March to August; *L. frenchi* and *caudata*, and *A. boisduvali*, commonly, at all times.

The table given below, which should be of interest to parasitologists, indicates the extreme measurements met with in adult females of both species of *Campsomeris*, together with the average length and width of second and third stage grubs of each of the six hosts concerned:—

MAXIMUM AND MINIMUM LENGTH AND WIDTH OF SCOLIID WASPS.

		Minimum.	Maximum.
Parasites {	<i>Campsomeris tasmaniensis</i> Sauss.	22 × 5.50 m.m.	30 × 7 m.m.
	<i>Campsomeris radula</i> Fabr. ..	16 × 6.50 m.m.	27 × 6 m.m.
Average size of Hosts (natural curved form)		2nd instar.	3rd instar.
Hosts {	<i>Lepidoderma albohirtum</i> Water.	22 × 7.50 m.m.	30 × 12 m.m.
	<i>Lepidiota frenchi</i> Blackb. ..	16 × 6.50 m.m.	25 × 10 m.m.
	<i>Lepidiota rothei</i> Blackb. ..	9 × 4 m.m.	14 × 6.75 m.m.
	<i>Lepidiota candata</i> Blackb. ..	21 × 7 m.m.	29 × 11 m.m.
	<i>Anoplognathus boisduvali</i> Boisd	16 × 5 m.m.	24 × 9 m.m.
	<i>Dasgynathus australis-dejeani</i> Mael.	12 × 6 m.m.	18 × 10 m.m.

FACTORS FAVOURABLE TO THE INCREASE OF "DIGGER-WASP" PARASITES.

AN ABUNDANT FOOD SUPPLY FOR THE LARVÆ.

Owing to some of our root-eating Scarabaeidæ having a two-year's life-cycle, cane-grubs may be found commonly at all times, although occurring in greatest profusion in the Cairns district from March to August.

One species of *Lepidoderma*, three of *Lepidiota*, and one of *Anoplognathus* are freely parasitised by *Campsomeris tasmaniensis* Sauss. and *C. radula* Fabr. The two favourite hosts, however, are *Lepidoderma albohirtum* Waterh. and *Lepidiota frenchi* Blackb.

Although previously reported (Bull. No. 7, Div. Ent., p. 15, 1918) that *radula* would not oviposit on grubs of *Dasgynathus australis-dejeani* Mael., subsequent experimentation by the writer with the autumn brood, during May of the following year, demonstrated that specimens of this wasp bred in our laboratory would very often parasitise larvæ of this Dynastid beetle. The negative results of former experiments in this connection may have been due to the fact that the wasps used in the first instance, had been ovipositing regularly for some days on grubs of *frenchi*, and so become accustomed to the fighting tactics of that species. In the absence of other hosts, virgin females of *radula* meeting with larvæ of *australis-dejeani* in canefields would probably victimise them as a matter of course.

I am inclined to believe that under natural conditions both *radula* and *tasmaniensis*—throughout their aerial existence—usually oviposit for the most part on grubs of the first suitable host encountered by them. We may reasonably assume that a wasp, after such initiatory contact, would profit by its experience, and be able thenceforward, even before entering the ground, to detect the presence of similar grubs on a plantation, and possibly distinguish them at once from those of related hosts that might chance to occur on the same area.

At Gordonvale, the Scarabaeidæ attacked represent not only different genera but three distinct sub-families, the larvæ of which, varying as they must necessarily do in habits, and to some extent in structure, would probably adopt slightly different fighting methods when defending themselves from digger-wasps. As an illustration (one of several cases) I may mention that a *bred* specimen of *tasmaniensis* that had from the first been regularly supplied with third-stage grubs of *L. albohirtum*—and during a period of 21 days had paralysed and oviposited on no less than 48 specimens of this host—upon being suddenly caged with a third-stage grub of *Anoplognathus boisduvali*, gave battle as usual, but was overpowered and cut in pieces by the new host; having, presumably, failed to immediately vary what had become its habitual method of attack in order to meet a changed, and unfamiliar, mode of defence. Strangely enough, the victorious grub in this instance was that of the smaller and less-aggressive of the two hosts concerned. As mentioned by the writer (Bull. No. 7, Div. Ent., p. 21, 1918), the laying of each wasp-egg is preceded by a duel, in which the parasite, although generally the winner, does not always escape unharmed. The seriousness of these subterranean combats is evidenced by the nature of the wounds frequently received. For example:—A specimen of *tasmaniensis* that lived 50 days in confinement, and eventually succumbed to such injuries after laying 65 eggs, was found to have lost ten joints of one antenna, four intermediate tarsal joints, and the same number from its hind feet; while a *bred* specimen of *radula* died from the effects of a gaping abdominal wound, after depositing 43 eggs.

AN ANNUAL PRODUCTION OF ABOUT FOUR BROODS.

In all probability the economic value of *Campsomeris tasmaniensis* Sauss. and *C. radula* Fabr. is mainly due to such factors as a favourable average annual temperature, coupled with an abundant food supply of grubs for the larvæ, which make possible the occurrence each year of at least four generations of wasps.

SPRING BROOD.

The first, or spring, brood is apparently derived from females which have started to lay towards the end of September, the earliest eggs from *radula* having been obtained on the 22nd and 27th of this month on hosts *Lepidiota frenchi* Blackb. and *Anoplognathus boisduvali* Boisd.; and from *tasmaniensis*, on the 27th and 28th, deposited on the latter host. Egg-laying, however, becomes general towards the end of October, and continues into November. Emergence of imagos from this brood takes place about the middle of December and extends into January. Thus a specimen of *radula*, captured 26th September, upon being supplied, a month later, with the third-stage *frenchi* grubs, laid 23 eggs between the dates 27th October and 25th November. A few of these were destroyed by acari; but, from the remainder eight male and nine female wasps were procured between the 16th December and 7th January. The life-cycle of wasps of this brood is about 47 days; the duration of the egg, larval, and intra-cocoon stages being 3, 8, and 36 days respectively; while the average shade temperature during the period of metamorphosis in the year 1917 was about 77° Fahr.

SUMMER BROOD.

No definite time can be assigned for the commencement of the second generation, as the preceding one merges insensibly into it, but, approximately, the period occupied by this brood dates from the middle of December to the middle of February. Female wasps of the first brood are able to oviposit within twenty-four hours after leaving the cocoons, and, being parthenogenetic, the females need not delay oviposition until after mating. Under natural conditions copulation probably takes place almost at once, as the males, which appear a few days before the females, usually remain near the spot from which they have emerged, flying restlessly to and fro over the surface of the ground, evidently anticipating the appearance of the latter sex.

Such behaviour is doubtless a response on the part of this insect to chemotropic influences induced by the occurrence in the soil of cocoons containing female wasps, and furnishes, indeed, a very striking illustration of tropic reaction. In the present instance this curious force, known as positive chemotropism, actually compelled numerous specimens of male digger-wasps, bred by the writer at Meringa in 1918, to haunt our laboratory verandahs for several days after liberation, instead of accepting their freedom and flying off to the fields in search of food or suitable

partners. During this period of expectancy they frequently entered and flew about the building, and when doors were closed they could often be seen knocking themselves against the glass, outside windows, endeavouring to get back into the room in which we kept breeding-trays containing female cocoons.

With reference to the duration of this second brood, the following summarised statement, derived from comprehensive data compiled by the writer during 1917-18, may be taken as fairly conclusive:—

The average lengths of egg and larval stages of *tasmaniensis* equal $3\frac{1}{2}$ and $7\frac{1}{2}$ days respectively, while the intra-cocoon condition (from 7th October to 11th February, at a mean shade temperature of 87° Fahr.) occupies a period of 36 days for male and $38\frac{1}{2}$ days for female wasps, the minimum and maximum number for the male being 31 and 40, and for the opposite sex 32 and 43 days. The number of eggs obtained from a couple of caught specimens of this species, which were deposited in cages on grubs of *L. frenchi*, was 65, from which were bred fifteen males and sixteen females; but, quite likely, additional eggs may have been laid by these two wasps prior to capture.

Another wasp, which was caught 19th December, and lived 48 days in confinement, deposited no less than 65 eggs, from which resulted 13 males and the same number of females.

AUTUMN BROOD.

Two specimens of *C. tasmaniensis* bred at our Insectary on 11th and 14th March, deposited, collectively, 157 eggs upon grubs of *L. albohirtum*, these resulting in 113 cocoons, from which were obtained, between 11th May and 16th August, a total of 76 wasps, all being of the male sex. Bred males had been confined with these two females for some days in a breeding cage directly after emergence of the latter, but presumably conditions conducive to mating had not been established. Perhaps the cage used was too small (12 by 15 inches), or did not receive sufficient sunlight. Possibly newly bred males may not be in a condition to copulate until after having flown for a few days in the open. It should be mentioned, however, that a wasp bred here on 5th January, and confined for a time with a male in a small glass jar only 6 in. high, containing damp soil, apparently succeeded in copulating under such seemingly unfavourable conditions, as it deposited 49 eggs, from which were derived 3 males and 11 females. We may assume from the foregoing results that temperature and humidity probably play an important part in this connection. Absence of female wasps in the above-mentioned autumn broods was certainly not due to seasonal influences, for a check experiment conducted by the writer the following year (May, 1919) with female wasps captured in the field, and therefore, presumably, fertilised, proved this autumn brood to consist, like the earlier ones, of wasps of both sexes in about equal proportion.

WINTER BROOD.

Eggs producing this brood are laid in June or July. The cooler weather, as might have been expected, retarded development of the life-cycle stages, and the eggs, for instance, which during summer weather hatch about the third day after deposition, require from 7 to 10 days or even longer during winter, while the period occupied by the combined egg and maggot stages varies from 18 to 24 days, under an average shade temperature of 68 deg. Fah. These combined stages, however, throughout January (summer brood) occupy a period of only 12 days, the temperature at that time being about 82 deg. Fah.

Nine specimens of *tasmaniensis*, captured between the 8th and 13th July, laid collectively 92 eggs on third-stage grubs of *albohirtum*, which ultimately yielded 20 male and 8 female wasps.

These emerged between the 8th and 26th October.

It will be seen from the above that these four broods, if taken together, represent a period of about 270 days. This, if extended over the twelve months, would permit of an interval of about 30 days between each brood, thus allowing a wide margin for various natural breaks that hinder breeding activities of the wasps, such as drought conditions, excessive wet, cloudy days, &c.

FACTORS AFFECTING THE EGG STAGE OF OUR DIGGER-WASP * PARASITES.

When dealing with subjects of such complexity, one cannot venture to do much more than outline a few of the chief controlling influences concerned; leaving almost untouched the intricate workings of natural control, which affect in varying degrees the multitudinous forms of organic life.

The eggs of *Campsomeris tasmaniensis*, Sauss., and *C. radula*, Fab., are placed singly on the mid-ventral area of the third or fourth abdominal segments of cane-grubs, and measure on an average about 3.20 m.m. by 0.90 m.m. They are greyish

pearly-white, of elongate cylindrical form with rounded ends, one of which (the less obtuse) is lightly glued by the wasp to the skin in such manner as to leave the egg projecting at right angles from the body.

Although placed within easy reach of its hind tarsi, the grub when normally paralysed does not disturb the egg, owing apparently to the sting having caused its legs to assume a bent contracted position, pointing towards the head. Hosts insufficiently paralysed, however, are able to move their legs with comparative freedom, and in such cases the egg of the parasite is almost certain to be detached sooner or later through accidental contact with one of the tarsi, a very slight touch being enough to knock it off.

During the course of experimentation it was found that these loose eggs, if artificially gummed to the ventral surface out of reach of the feet, hatched in due time, and the resultant larvæ matured in a natural manner. When two larvæ were forced to feed on the one grub, duration of the larval period was shortened, both spinning cocoons at the end of six days, and these ultimately producing a wasp of each sex. In an experiment made with five eggs artificially gummed to the body of a single grub, four of the parasitic maggots fed up successfully and spun cocoons, while the fifth, which had been put on the anal segment of its host, died, when half grown, from having imbibed juices contaminated with ingested earthy matter, which is always present in the last body-segment of our cane-grubs, and had evidently disagreed with it. One male and three female wasps were obtained as a result of this curious experiment, one of these being an abnormally small specimen of *C. radula*, measuring 14 m.m. in length.

Under natural conditions, the larva, when hatching, at the end of the third day, ruptures the free head-end of the egg, and, remaining in the pliable chorion, bends its head downwards until able to reach the skin of the grub; the still-attached base of the eggshell affords a support to steady the tiny parasite while biting through the tough skin, and buries its head securely in the living tissues of its host.

When emerging from a detached egg which has fallen on the soil, the young maggot appears quite helpless and unable to adapt itself to altered conditions, or to reach the body of the grub lying so close at hand. We may, I think, assume that under such circumstances fully 90 per cent. of eggs rubbed off by semi-paralysed grubs would inevitably perish, and that each lost in that way would, in five cases out of ten, represent a loss to the next brood of about thirty female wasps.

DESTRUCTION OF EGGS BY ACARI.

Whilst breeding hundreds of digger-wasps at Meringa (1917-18), about 20 per cent. of eggs laid by these parasites were destroyed by Acari, which occur commonly on our various scarabæid grubs.

These Rhizoglyphid mites, according to Tryon, do not attack the grubs, but merely use them as carriers on which to travel through the soil until reaching congenial food. Whilst habitually roaming freely over the body they may, in the first instance, when meeting with a wasp's egg, be induced to feed on the sticky secretion attaching it to the skin of the host. The delicate chorion being soft and easily injured, such interference would soon result in rupture of the base of the egg, followed by an exudation of albuminous matter. This rich food proves very attractive, as, when eggs are so punctured, mites traversing the body soon discover and congregate around the tempting morsel. Acari occurring on a paralysed larva do not, so far as observed, feed on its body until life has departed and decomposition set in. In one instance, however, they were seen by the writer to devour a fully grown maggot of *Campsomeris tasmaniensis*, Sauss., that, having been forced to pupate out of a cell, had been unable to spin a complete cocoon. The mites in this case did not attack the living maggot until after some decaying remains of the host-grub on which they were feeding had been removed from the cage.

EGGS ATTACKED BY FUNGUS.

In a few instances a fungus (of undetermined species) was observed enveloping eggs and very young larvæ, which had received no mechanical injury of any kind, so apparently entomogenous in nature.

BACTERIAL DISEASE OF EGGS.

About 5 per cent. of eggs of *Campsomeris* laid at our Insectary were destroyed by some obscure disease (undetermined), probably of bacterial origin. This mortality was not due to infertility, since other eggs deposited subsequently by the same wasp produced larvæ, and ultimately imagoes of both sexes.

The first indication of this disease appears near the head-end in the form of a few red lineolate marks, which after some hours become suffusions, until finally the entire central portion of the egg clouds over with pale rusty-red. In other cases the internal fluids gradually turn brown, the egg becoming more and more misshapen, until ultimately breaking down into a viscid mass.

The latter disease was recorded for the most part during October and November, the average shade temperature at the time being about 78 degrees Fah.

MORE LIGHT ON POWER ALCOHOL.

The possibilities of securing an abundant source of alcohol for power purposes affords a question which deeply concerns many regions of the world. The British Department of Scientific and Industrial Research is continuing investigations of this important problem. A special officer was appointed to collect data from different parts of the world as to the possibility of producing alcohol in bulk from local vegetable materials. The actual building up of alcohol from various substances, such as calcium carbide, has also been carefully studied. At present the results attained are not altogether promising; and the British authorities consider that the best prospect lies in evolving a process, either mechanical or bacteriological, of producing alcohol commercially from tropical vegetation or waste vegetable materials.

QUEENSLAND TREES.

By C. T. WHITE, F.L.S., Government Botanist, and W. D. FRANCIS, Assistant Botanist.

No. 12.

THE IVORYWOOD.

This tree is a tall scrub species, ranging from the Clarence River in New South Wales to Mount Perry, near Bundaberg, Queensland. It is known to botanists as *Siphonodon australe*. On account of the resemblance of the fruit, in size and shape, to the large yellow guava, it is sometimes known as the Native Guava. The trees attain a barrel diameter of 2 feet, and a height of about 130 feet; they are very tall, slender trees, as a rule. The barrel is not prominently flanged. The bark is mostly furrowed or wrinkled and is often scaly, is grey in colour, and when cut is seen to be light-brown, with a flesh-coloured innermost layer. It measures three-eighths of an inch thick on a tree with a barrel diameter of 2 feet. The trees are generally readily distinguished from other scrub trees by chipping off the outermost layer of bark and exposing a yellow or ochre-coloured substance in the interior of the bark. This deeply coloured substance can be found beneath the outer layer of bark in most of the trees. The wood is white or pale yellow, and very closely grained. It has been suggested as a substitute for English Box, a timber which it closely resembles in appearance.



Photo. by the Authors.]

PLATE 6.—THE IVORYWOOD (*Siphonodon australe*).

A tree, with a barrel 2 feet in diameter, in the Imbil Scrub.



PLATE 7.—THE IVORYWOOD (*Siphonodon australe*).
Showing leaves and fruit.

THE BANANA BEETLE BORER.

The Hon. W. N. Gillies, Minister for Agriculture, has made available the following memorandum on the "Banana Beetle Borer" by Mr. John L. Froggatt, B.Sc., Entomologist of this Department:—

"In the banana-growing industry of Queensland, there appears to be a large number of growers who either do not understand how to detect or are unaware of one of the worst pests they have to face, and in some cases, combat—namely, the banana beetle-borer. Through this lack of knowledge many have found, to their cost, that they have either purchased an infested plantation, or, by introducing suckers from infested areas, have brought in the beetle-borer. Often before its presence is discovered it has become well established and has caused appreciable damage to the plantation.

"There are many banana-growers, and others interested, however, who consider that the beetle-borer is not a serious menace, and on this account do not worry and let the beetle continue its work of destruction unhindered. By so doing, they are laying up an abundant store of trouble not only for themselves but also for their neighbours and the district generally. Such plantations form ideal breeding-centres from which the pest may easily become disseminated.

"It is fully recognised, on the other hand, that there *are* growers doing all they can to combat the pest and many others who doubtless will also co-operate in checking the increase of the beetle-borer as soon as they realise the seriousness of the problem.

"After carrying out extended observations in the field, it is most apparent that the banana beetle-borer *is* increasing and spreading; this is particularly marked in plantations where control measures are either neglected or carried out in so insufficient a manner as to be of little or no value.

"In laying out a plantation there are two very necessary precautions to be observed—

1. Make sure that the plantation from which the suckers are being obtained is free from beetle-borer infestation.
2. Do not plant alongside or adjacent to infested areas. Where this has been already done, precautions must be taken to prevent the beetle-borer spreading into the new plantation.

"The founding of a clean plantation rests very largely on the strict observance of these precautions.

"To consider the reasons for these statements—

1. If a plantation be infested, even allowing that the suckers when dug out of a stool may be free from beetle-borer, yet while they are lying on the ground (acting for the time as baits) beetles may be attracted to and lay eggs in some, if not all, of them. The eggs, being very difficult to detect, may be entirely missed, even should an examination of the suckers be made. Where the suckers are large and vigorous and the season favourable, the suckers may develop into plants, even with one or two larvæ (grubs) in them. Once the beetle has become established in a plantation, it will require a great amount of constant systematic work to keep it in check.

Butts, sometimes used for planting, are more easily examined than suckers, as, if infested, they should show larval tunnels on being opened up. Even in cases where they appear clean, however, eggs may be present and be overlooked.

2. A number of instances have been noted where plantations have been laid out alongside infested areas and have subsequently become infested. Where this is found to have been done, corm baits should be laid between the old and new plantations in alternate rows and examined periodically. Whenever practicable, it is advisable to dig out and destroy the infested stools, and baits should be laid out on the sites of the stools. This will help to hinder the beetles migrating, and the destruction of those trapped will further minimise the risk of infestation.

"The presence of beetle-borer at any stage beyond that of the egg stage, in a plantation, is most readily detected in the old butts, &c., in the stools or in stems or old corms lying on the ground. By cutting these open, the beetle-borer is evidenced, if present, by the larval tunnels; larvæ and beetles may be found. Suckers often, though not always, give an indication of beetle-borer by presenting an unhealthy appearance, noticeable particularly in the leaves. On being removed and cut up, if infested, larval tunnels will be seen in the corm.

"Where a plantation is found to be infested, all badly infested stools, and in slightly infested stools all old butts, &c., should be dug out and chopped into small

pieces; stems on the ground should be split lengthways. Burning, where practicable, is the most effective, of course. By this means natural decay and drying-up proceed very rapidly, and the grubs present are unable to reach maturity, while the butts and stems cease to be possible breeding-grounds. Corms dug out of the stools and left lying on the ground have been found to be breeding numbers of this pest *four years afterwards*. Stems cut down after bunching and left on the ground have been found to be breeding considerable numbers of beetles many months after being cut down. The rotten material of decaying stems also acts as harbourage for beetles. As soon as the stools are cleaned of the old material, large pieces of clean corm should be laid, cut surface downwards, flat on the ground, to act as baits, and the beetles found on the under surface of the bait, or just underneath the soil under the bait, removed and destroyed. These baits should be removed after about ten to fourteen days and destroyed, because eggs will be laid in them. As a result of tests carried out in the field, it has been found that the beetles are, apparently, in the greatest numbers in the immediate vicinity of the stools, so that the best positions in which to lay baits are inside and just outside the stools. If this work of prevention be thoroughly and systematically carried out, a great deal can be done to check the increase and spread of the pest, *but it must be carried out continuously to be effective*.

“To briefly describe the different stages in the life of the beetle—

“*The Egg* is white, and about one-twelfth of an inch in length. It is very difficult to detect in either plants or suckers; generally it is laid at the junction of the stem and the bulb, lying just under the surface of the plant.

“*The Larva* (or grub) when full grown is slightly more than half-an-inch in length, and rather stout. The body is white, with the head dark reddish-brown. It is the grub that causes the damage to the plant.

“*The Pupa* is white and about half-an-inch in length. It is nearly always found just under the surface of the bulb (below ground level in cases where the corm is in the ground). Just before full development is reached and the beetle is ready to emerge, the pupa shows a slight colouration (yellowish to reddish-brown). This is a resting stage.

“*The Beetle* (belonging to a group of insects commonly called weevils) is just under half-an-inch in length; it is black in colour and has a long, slightly curved trunk in front of the head. When disturbed it lies for a considerable time as if dead. Where it is present in a plantation it will be found in old corms and rotting stems or in the rotting butts in the stools.

“Many queries (and also many wild statements) are made on the subject of natural enemies (or parasites) of the banana beetle-borer. So far only one natural enemy of the beetle-borer is known in Queensland. This is the larva of another beetle which follows up the tunnels made by the grubs of the borer, and which has been observed to attack both the grub and the adult beetle. This parasite has only been found on three occasions, on two of which only a single larva was seen.

“Any positive information on this subject will be welcomed, as it is an important one.”

In a previous report on the results of his work in the Southern Coast districts of Queensland, Mr. Froggatt cites two cases which were examined thoroughly in the early part of 1921—No. 1 in April, and No. 2 in January.

The conditions in the two plantations were similar, except as to age; both were well sheltered and below the ridge. No. 1 was about eighteen months old; No. 2, about four years. The depredations of the pest were approximately the same in both cases, being but slight, and localised in a small area.

In No. 1 plantation, on the discovery of the beetle-borer the owner immediately began to systematically destroy all infested corms and stems, and to lay “baits” in and around infested stools. These measures were carried out for several months. In July, 1921, this plantation was again carefully examined, when very little trace of beetle-borer infestation was found. Towards the end of 1921 this plantation was sold, and the new owner did not carry on these preventive measures. In May, 1922, beetle-borer infestation was found in approximately the same area and in apparently about the same numbers as when first found. Only a small number of old corms and cut stems were found to be infested, and the plantation looked very healthy.

In No. 2 plantation the pest had been allowed to progress almost unchecked, with the result that when a further examination was made in March, 1922, practically every old corm and cut stem was found to be riddled by the beetle-borer, as also were corms and stems in the stools, and this over a greatly increased area. In this time the plantation had gone back tremendously. This comparison, which was only one of many, showed, on the one hand, what could be done by consistently and systematically carrying out preventive measures, and, on the other, what happened through neglect of necessary precautions.

POULTRY.

SELECTION OF LAYERS.

The "Journal of the Department of Agriculture," Union of South Africa (April, 1922), publishes the following very useful and instructive paper by Professor A. Owen-John, F.B.S.A., Lecturer in Poultry, Grootfontein School of Agriculture, Middleburg, Cape:—

"Much has been written during the past few years on the very important subject of selection of layers. We, in South Africa, have not been backward in applying the various methods put forward from time to time as indicative of productivity in our laying breeds of poultry. It is by no means a difficult matter to select the layers at the end of the laying season, or after a fair period of productivity, as then the lack of pigmentation or bleaching in the various sections is sufficiently pronounced. The greater difficulty is to select the prospective heavy producer either at the commencement of her laying period or even before she has commenced to lay. It is in this connection that it is desired to make a few observations on the selection of layers.

"During the past three to four years I have carried out investigations at this Institution with a view to finding certain characters which could be considered indicative of high producing capacity in young birds. The method of procedure adopted has been as follows:—

"We have seventy-two individual test pens where the most promising pullets are tested out for twelve months; this test usually commences either in March or April. The breeds used in the test have been:—South African Utility White Leghorns, Brown Leghorns, White Wyandottes, White Orpingtons, and Buff Orpingtons.

"The ages of the various birds are from five months in the light breeds to seven months in the dual-purpose breeds.

"When the seventy-two birds are selected and allocated to their individual pens, a complete description is taken of each bird, and entered up on the back of the record sheet; no detail is omitted. The test is carried out for the year. Each egg laid is entered up according to date and grade—viz., first, second, or below grade, as the case may be. During the last week of the test another detailed description is taken and entered up on the back of the record sheet immediately below the first description, and comparison made between both, also with the record put up by the individual.

"In this way useful information has been gathered. Further, each year I handle large numbers of birds in the course of itinerary duties, when grading and mating stock, inspecting private plants, and judging at shows. Many of the birds so handled have been tested or are about to be tested in private as well as public laying tests, giving thus a still wider field for obtaining information.

"From the foregoing investigations we find that there are almost invariably found in pullets certain characters that will prove the birds to be good producers, and, therefore, of great assistance to the breeder when selecting his birds.

"In the first place, the head or skull should be of medium length, inclined to long (not short, as usually described). We have found this to be pronounced in all cases, particularly in Leghorns. Moderate length from back to front or base of beak, not snaky, with good depth from crown to underside, and of good width across the top. Beak of moderate length and stout. Eye bright and full, standing well out on each side of the head. The shape of the eye is important; the round eye is not so desirable as the oval shape.

"The neck should be of medium length, inclined to long, well covered with feathers and curving gracefully on to the body. The short neck is an indication of a sluggish disposition or an inactive bird; consequently a poor layer. Length and depth of body are essential, with good width of back, allowing full play for the ovaries, the depth of body, especially toward the posterior of the bird, denoting capacity. This should not be confused with a short breastbone, which would naturally allow sagging of the abdomen as found in some birds, and may be mistaken for indications of capacity.

"The pelvic bones (and there is great contention as to whether they should be very fine or not) we have found to vary in thickness or fineness, showing no particular uniformity in this respect, but always pliable in the good producer. The thickness of bone may be anything from one-sixteenth to five-sixteenths of an inch; the pliability is likely to increase with production. In the indifferent producer it is rigid with no springiness even in the pullet, although its thickness may be the same as the good producer. The shape of the pelvic bone is also important; it should curve gracefully toward the vent with no evidence of being hooked at the points. Width between the points of the pelvic bones, and again depth from there to point of breast bone, is important. This varies, of course, in the pullet about to lay, and excessive measurements cannot be expected, but there must be indications of reasonable measurements between these points, such as $1\frac{1}{2}$ to 2 fingers width between points of pelvic bones and $2\frac{1}{2}$ to 3 fingers width between pelvic bones and point of breast bone.

"When testing these sections with the hand, the good producer will give evidence of a springiness of frame expanding with ease to the touch of the hand.

"The texture of abdominal skin is another sound indication of laying qualities, showing fineness and elasticity, with no tendency to coarseness. This quality is found to increase with production, and is always present even during the bird's period of rest while moulting. I have not yet handled a hen with a coarse, unelastic abdominal skin which could be accused of putting up a good laying record.

"We have come to the foregoing conclusions from actual tests carried out as stated above. It is felt that it would be superfluous to deal with the necessity of evidence of health, vigour, and constitution in the high producer, as this essential should be understood sufficiently well.

"We have followed in our selection of stock annually the lines indicated with a marked degree of success. All birds used in these tests are line bred. It is surprising how little change is to be found in the description taken at the commencement and the one taken at the end of the test, the only marked difference being that of the greater width between points of pelvic bones and depth between those and point of breast bone; also, as above stated, an increased fineness in texture of abdominal skin. Several of our test birds each year, among the light breeds, show a marked growth of spurs almost like a male bird, toward the end of the test.

"There is one other item which may be of interest, although not bearing on the subject; it is usually accepted that the dual-purpose breeds of poultry are superior for winter egg production. Our altitude is 4,100 ft. above sea-level, our winter is extremely dry, but cold and inclined to be windy, yet the White Leghorns prove infinitely superior winter layers to any of the dual-purpose breeds, and yet these breeds appear to stand the extreme heat of summer better than the light breeds."

SETTING EGGS.

If you are using an incubator, set only eggs that you would consider the best shape and size for the breed, carefully follow the instructions of the manufacturer, and use only a machine that has a good reputation. Usually a cheap machine is dear at any price.

The best place to run an incubator is in the cellar where there is fairly good ventilation. A little moisture in the atmosphere is an advantage, and the steady temperature makes the location far more desirable than in a room in the house.

If the machine is of a reliable make, and good fertile eggs are used, with an accurate thermometer registering $102\frac{1}{2}$ degrees at the level of the top of the eggs without too much variation throughout the incubating period of 21 days, you should secure a hatch equal in number and condition of chicks to any that you might get under natural conditions with hens incubating a like number of eggs.

When oil lamps are burned without cessation for long periods, as they are with incubators, there is always an element of danger, unless proper precautions are taken. Only the best grade of oil should be used and the wick and burner kept scrupulously clean.

A little moisture is supplied to the egg chamber in the most convenient manner by the use of moist sand in a tray under the eggs. It can be withdrawn if the moisture is excessive, and returned to the machine if the air cell in the egg shows signs of too rapid evaporation. It is safe to say that more hatches are spoiled through lack of moisture than otherwise, but it is possible to err in either direction. Ability to recognise moisture conditions and requirements will be attained only with experience.

The success or failure of your whole year's work may depend upon your efforts in the incubation season. Whether you hatch by incubator or by hen, April is the month that gives best results.

For a hen, use a nest that can be kept closed except when the hen is off to feed. Test out the eggs on the seventh day. In the early season this sometimes makes it possible to put all the fertile eggs of two settings under one hen and reset the other, thus saving valuable time.

Prepare the setting nest with care, clean and spray, and, when dry, place a moist sod, that has been shaped to fit and hollowed a little in the centre, in the bottom of the nest box. Cover with a layer of fine hay. Dust the hen with flowers of sulphur or other reliable lice killer, and set on eggs that are normal in size and shape for the breed. Keep whole corn, grit, and clean water within easy reach, and see that she is off once a day and returns to her nest promptly in cool weather.

At the first sign of pipping, close up the nest after making sure that the hen has a full crop and a drink, and leave her alone till the hatch is complete. Remove shells and unhatched eggs, and allow her to remain on the nest with the chicks until showing signs of uneasiness. Remove to a clean, well-disinfected coop with clean, sanded floor.

SUGAR : FIELD REPORTS.

The General Superintendent of the Bureau of Sugar Experiment Stations has received the following report from the Southern Field Assistant, Mr. J. C. Murray:—

“During the month the cane-growing areas of Maryborough, Pialba, Yerra and Childers have been visited.

“*Maryborough.*—Very dry weather has considerably retarded the growth of cane at this place. The canes are presenting a wilted appearance, and if the drought continues some of the cane will be too far gone to successfully ratoon. However, there is still a chance of a fair crushing. The varieties holding out and showing greater hardihood than others are M.1900, D.1135, and Striped Singapore. No disease is in evidence, nor is damage being done by insect parasites. Efforts should be made by the growers to obtain a greater range of cane varieties, also to do more local experimenting with chemical fertilisers and, most important of all, to cultivate thoroughly and to continue to cultivate, until it is impossible to get into the cane. It is only by intensive cultivation of these soils, combined with the introducing of as much vegetable matter and animal manure as possible, that the successive dry stages can, in a measure, be combated.

“On much of this Mary River country, lighter ploughs than those generally in use could be utilised. This would mean a saving of horses, greater pace, and consequently finer tillage. The use of the disc harrow would in some cases be of a decided advantage. All these measures tend to give the soil better texture.

“*Pialba.*—This area is looking very dry, but the cane appears to be in good condition. No disease is causing deterioration, and insect parasites have, so far, not attracted the farmer's attention. A visit was made while at Pialba to Takura, where there are a number of growers. The farmers' prospects in this locality were very fine until the dry spell started. The cane, however, did not wilt rapidly, probably owing to good previous cultivation and maintaining of the sweetness of the soil by efficient drainage. Good drainage is of the utmost importance in cane cultivation. Plant roots must have air, and this is impossible if they are resting in water.

“Some of the growers at Takura have considerable areas of cane under cultivation and deserve to make progress. Pulverised limestone has been used in places, but the results are negative. The reaction of the soil is, on an average, slightly alkaline. Green maize could be ploughed under to advantage as a means of supplying humus.

“Varieties doing best are 1900 Seedling and Demierara 1135. Q.813 should do well here; also Black Innis and H.Q.285. Growers are advised not to cut the 1900 Seedling too early.

“*Yerra.*—This area is not suffering so badly from the lack of rain. This may be on account of the heavy scrubs and forest that abound, which make for more humid conditions, even where rain does not actually fall. The farmers, too, are cultivating well, realising that this is the essence of farming under dry conditions. Much good land still remains to be opened up round Yerra, and better roads are absolutely essential if the people are to have comfortable access to their railways and markets. The unnecessary destruction of timber is to be discouraged in these parts. Trees and scrubs contribute to the rainfall, and settlers and timber-getters should keep this in view.

“Regarding varieties on that part of Yerra which was inspected, Striped Singapore is making easily the best showing. This cane is exhibiting great hardihood and displaying all the characteristics which commend a variety to the farmer. To keep Striped Singapore in this condition, care should be exercised in plant selection, as the cane is generally considered susceptible to the disease known as gumming. 1900 Seedling and D.1135 are making a fair showing, especially the former.

“The farms in the Yerra district are not as accessible to the plough as on most cane-growing areas; consequently it is rather surprising the farmers have done the cultivation they have.

“Childers.—This important sugar centre is demonstrating at present the vicissitudes of the cane-farmer. Three months ago a great crop was in view, but subsequent dry weather will reduce the original estimate many thousands of tons. Much of the cane is still green, especially the 1900 Seedling, but the yellow appearance indicating the effect of drought is beginning to show in most fields.

“Everything possible in the way of good cultivation has been done by the farmers, and if the rain fell immediately there would still be a good season, owing to the rapid response of the Childers soils to good weather conditions. This would apply especially to the 1900 Seedling and other varieties which are usually cut about mid-spring. The growers are advised to concentrate on getting greater supplies of Q.813 for planting, and also early maturing varieties, such as Black Innis and H.Q.285, preferably the latter. Very little fertilising is being done at present owing to the dry weather. There is no dearth of water in the drains and creeks, all of which are running strongly.

“Dallarnil.—There is not a great deal of cane grown here, but a very fine sample of this product was in evidence at Mr. Hambleton's farm. The variety was Striped Singapore, and, considering the stretch of dry weather, has done remarkably well. The soil round Dallarnil is, on an average, a fairly rich loam, and with anything like an average rainfall it should produce good cane. Other varieties doing well at Dallarnil are M.1900 Seedling, Hybrid No. 1, and Q.1098. Mr. Brookfield has the two latter growing on his place; also Shahjahanpur No. 10 and Q.970. These two canes, however, are not doing very well. The Hybrid No. 1 is a good cane, and is worth looking after. This farmer obtained these canes from the Sugar Experiment Station at Bundaberg some two years ago, and they would probably have all grown well only for the drought.

“Booyal.—There is some good land in this district under cane, but the dry weather will considerably reduce the original estimate. This is disappointing for the grower, as several have put in much hard work on their properties planting cane. However, the district is holding its own with the other areas under review, and cane-planting is justified here with normal rains. The best variety appears to be Striped Singapore. D.1135 and 1900 Seedling are also making a fair showing.”

SHOW DATES 1922 AND 1923.

Show society secretaries are invited to forward for insertion in this list dates of forthcoming shows. Alterations of dates should be notified without delay.

Gayndah: 4th, 5th, and 6th July.

Nambour: 5th and 6th July.

Townsville: 5th and 6th July.

Charters Towers: 11th and 12th July, 1922.

Gatton: 12th and 13th July.

Proserpine: 13th, 14th, and 15th July.

Rosewood: 19th and 20th July.

Caboolture: 20th and 21st July.

Mount Gravatt: 22nd July.

Barcardine: 25th and 26th July.

Crow's Nest: 26th July.

Pine Rivers: 28th and 29th July.

Wellington Point: 29th July.

Coorparoo: 26th August.

Kenilworth: 31st August.

Beenleigh: 1st and 2nd September.

Zillmere: 1st and 2nd September.

Gympie: 7th, 8th, and 9th September.

Wynnum: 9th September.

Imbil: 13th and 14th September.

Laidley: 13th and 14th September.

Sherwood: 16th September.

Rocklea: 23rd September.

Kileoy: 28th and 29th September.

Esk Camp Drafting: 4th and 5th October.

Pomona, 4th and 5th October.

Southport: 6th October.

Enoggera: 7th October.

Sandgate: 4th and 5th August.

Royal National: 7th to 12th August.

Belmont: 19th August.

WARWICK.—Eastern Downs Horticultural and Agricultural Association: 13th, 14th, and 15th February, 1923.

GENERAL NOTES.

A Possible New Industry : "Shammy," or Oil Leather.

We frequently receive from men on the land requests for information as to the tanning of opossum and calf skins. The following method of converting skins into the soft so-called "shammy" leather may be of interest to them. Shammy, we may say, is a corruption of the pronunciation of the Swiss-French name of the small deer, the chamois, because it was first produced from the skin of the chamois. The process is thus described by the "Agricultural News," Barbados:—

"The large consumption of imported shammy leathers in the West Indies for motor-car, carriage, and other cleaning purposes, the large export of raw goat and sheep skins to America, and the ease with which goat and sheep can be raised, especially in the Northern Islands, have amongst other considerations suggested the idea that shammy leather making might well form a suitable minor industry for the West Indies.

"In accordance with this idea, the following notes have been prepared for the benefit of those readers who may care to carry out experiments:—

"Shammy leather manufacture is the oldest system of leather-making; but well-shammied leather requires the exercise of much care and numerous manipulative processes. These processes are partly mechanical, partly chemical, and partly bacterial; and although the following describes these processes in a general way, it is likely that they may need modification under tropical conditions such as obtain in the West Indies. The information given is only intended as a guide to the way shammy leather is made, on a small scale, in England and France.

"1. *Skins*.—Sheep skins are chiefly used, but goat and other skins are also employed.

"2. *Soaking*.—Only dried skins need to be soaked.

"3. *Unhairing*.—Soak in slaked lime solution for several days (6 lb. of burnt lime to 100 gal. of water—rain water is best). Add $\frac{1}{4}$ per cent. sodium sulphide on the weight of the skins as a sharpener. This will reduce the time required for immersion.

"4. *Splitting*.—The skins are split after the completion of the liming process, and the loose and fatty middle layer is removed by a sharp knife, stretching the skin on a convex plank if possible.

"5. *Drenching*.—Part of the lime is then removed by 'drenching.' The skins are put in an infusion (4 parts of bran to 1,000 parts of water). When the skins become white and soft and retain the impression made when probed with the finger, the process is finished.

"The change is brought about by the acids produced in the fermentation of the bran. The drenching process can be brought about much more quickly by a solution strength of 2 lb. of lactic acid in 100 gallons of water, instead of the bran infusion; but the bran infusion is probably much cheaper.

"6. *Removal of Water*.—After draining the skins, as much water is removed as possible by pressing. This allows for the absorption of oil in the next process.

"7. *Oiling*.—This is the essential process. The skins are staked out on a board, fish oil is added, a little at a time but evenly, and the skins are hammered severely with a heavy mallet. (A machine called 'a fuller stock' is used on a large scale.)

"8. *Drying*.—As soon as the skins are saturated with oil, they are hung up dry; but do not let a skin dry until it has properly and evenly absorbed its oil.

"9. It may be necessary to repeat 7.

"10. *Heating*.—Next heat the skins in a stove. This causes some of the oil to oxidise. Though the skins must be heated to a fairly high temperature, care must be taken not to let them burn. As soon as they turn yellow and give off a peculiar odour, not like fish oil, the process is complete. Lay out the skins to cool.

"11. It may be necessary or better to give the skins a little extra natural heating by packing them in a box and letting them sweat.

"12. *Washing*.—The skins, after cooling, are dipped in water and then wrung or hydraulically pressed. They are then ready for use."

Spotted Wilt of Tomatoes.

Tomato plants infested with the spotted wilt disease have been under observation in the suburban gardens (Sydney) throughout the winter, to decide whether or not the disease winters on the old plants. One old vine still alive is at present (11th July) showing the typical symptoms of wilt—*i.e.*, the brownish appearance of the leaves and of the young shoots. As some growers had already commenced (March) to plant out young seedlings, the possibility of their being infected from old vines is apparent. While the exact method of transmission of the disease from plant to plant is unknown, it would be wise for growers to destroy all old vines by burning before commencing to raise early seedlings.—“Agricultural Gazette of New South Wales.”

Australasian Association for the Advancement of Science.

We have received from the hon. secretary of the Agricultural Section of the Australasian Association for the Advancement of Science, Mr. B. C. Aston, the following notice of the meeting of the Association to be held at Wellington, New Zealand, in January next:—

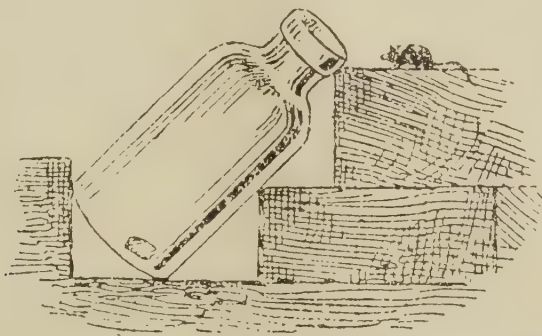
The Wellington meeting of this Association will be held in January next. This will be the third time that the Australasian Association for the Advancement of Science has met in New Zealand, previous meetings having been held in Dunedin and Christchurch.

It is desired to make the Agricultural and Veterinary Sections outstanding features of the meeting, and owing to the comparatively large number of professional agricultural officers employed by the Government and various institutions in New Zealand, compared with other States of the Empire, it is anticipated that the programme of these Sections will be filled to the utmost limit.

The Session of the Association is fixed to begin on 9th January, 1923, but authors of papers which they desire to read or have read at the meeting should send in the titles as soon as possible to the hon. secretary in order that suitable arrangements may be made to ensure a proper treatment for each contribution. It is only desired that the titles of papers should be sent in at first, but the whole of each paper, with an abstract prepared by the authors, should be in the hands of the section honorary secretary not later than 27th January, 1922.

A Useful Mouse-trap.

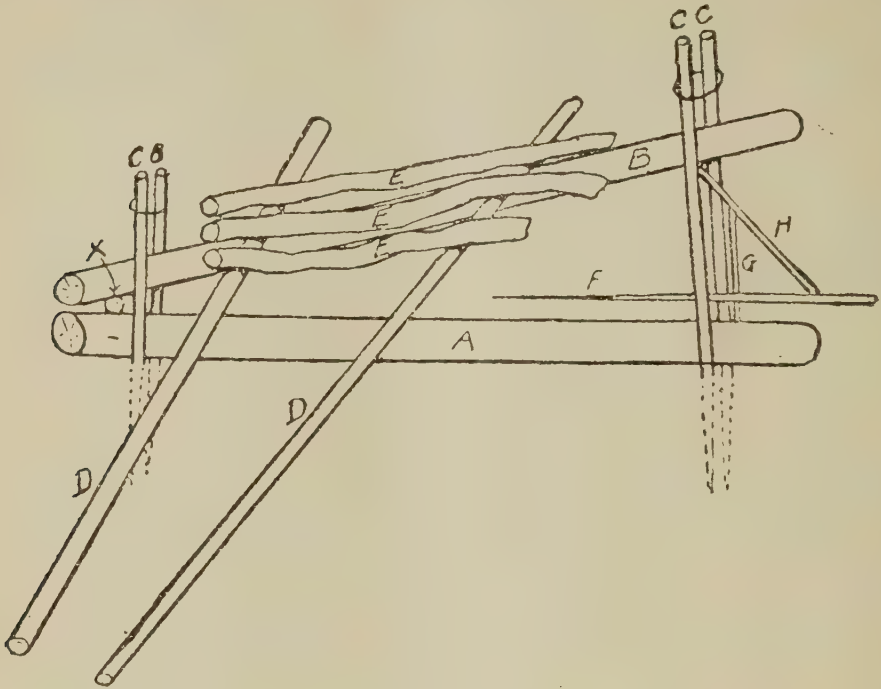
Mice are easily caught if one goes the *right* way about effecting their extermination. A cat is useful in this work, but she cannot eat more than her fill. A dog is too active to watch and wait like his feline companion. Traps want constant attention, and, moreover, they become recognised by the wilier members of these pestiferous vermin. Poison is dangerous; besides which, mice destroyed in this way often die in the runs, and so give rise to offensive odours. Bottles will catch mice alive or dead, as may be required. These bottles should be vessels with fairly open mouths, and not too-long necks, and, when in position, should be placed at an angle, as in the accompanying diagram, with means of approach.



If something is inserted as a bait, with a scent sufficient to attract the attention of the little animals, they will soon investigate the inner recesses of the bottle, and, once there, their exit is more than they can effect themselves. The glass affords no foothold, and although they may spring as far as the bottle neck, down they slide, to repeat the effort until exhaustion compels them to desist. If a poisoned bait is put into the bottle, the traps should be constantly visited, and the bodies of the victims emptied out. Barns, corn-lofts, stacks, and other places about the farm can be cleared pretty effectually of rats and mice by this means; only in the case of rats the bait should always be poisoned.

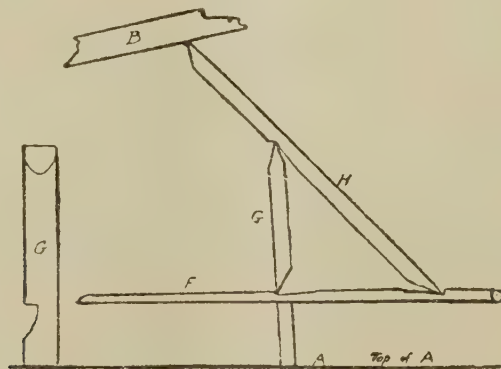
The Russian Wolf-trap.

A trap which is commonly used in Russia for catching wolves and foxes is very simple in its construction, as will be seen by the accompanying illustration, and effective in its work.



To construct it firmly lay on the ground the bedpiece marked A. Then proceed to place the four stakes, which must be pointed to drive into the ground, to keep the fallpiece marked B in position. Lay B on A with a piece of timber the size of the wrist, as shown at X (Fig. 1). Then secure the tops of the stakes CCCC with either rope or wire which has no smell about it. Now lay on the two bearers DD to hold the loading marked EEE. Provide this loading, and you are prepared to set the trap.

The trigger is the next consideration. It is simple and easy to construct with a pocket knife out of a branch the thickness of a whipstick and with the bark left on to make it less conspicuous. FGH is the trigger in three pieces. Determine the intended height of the trap between A and B at the position of the trigger-post G, and let it (the post) be three-quarters of the height. Let H be the strongest piece, as it has to bear the weight of the loading. The piece F is the slightest,



TRIGGER.

with the stouter end to the right hand of the trap, as shown in Fig. 1. In preparing the trigger see sketch No. 2 enlarged, and mate the pieces in proportion, as shown in Sketch No. 1, and it will be evident that the slightest pressure on F is sufficient to disengage it at the catch I, when the B with its loading collapse on to the intruder—wolf, dingo, wallaby, or fox.

Sometimes the traps may be neglected for a time, and dead vermin allowed to lie in them till they decompose. In this case, do not reset the traps immediately, but put a prop under the fallpiece to keep it up, and bury the trigger pieces for a week to sweeten them, so that the vermin may accustom themselves to the track again.

In placing the trap in position, it should be arranged so that the part F on the trigger comes in the centre of the track or hole in any fence, and the load-bearers DD should be so arranged as not to come in contact with any obstruction when they fall on the vermin, or the latter may effect their escape.

The loading may be made as heavy as circumstances seem to require.

If logs are scarce in some parts of our plain country, a flat-shaped boulder may be fixed up to give weight. The trigger, or acting portion of the trap, is on the principle of the old-fashioned figure-of-four trap which was used for trapping mice and birds in gardens; and keep them down they did, for a large flat stone was used for the purpose. This Russian trap is well worth a trial in Queensland where dingoes are numerous, as it costs nothing but the slight labour needed for its construction.

The Dingo Pest.

Mr. Howard Skinner, Beardie Lagoon, Dirranbandi, in a letter written to the Department of Agriculture and Stock, asks for information concerning any reliable decoy that will induce dingoes to enter traps. The matter was referred to Mr. E. M. Land, M.L.A., who, in reply, said that several methods for the destruction of dingoes are employed, the principal of which are:—

- (a) Poison baits;
- (b) Traps;
- (c) Hunting dogs, such as wolf and stag hounds;
- (d) Skilled men who know the habits and haunts of the dogs.

Poison baits account for the destruction of the great majority of dogs, and the process adopted for making baits is to secure about an ounce of meat, raw or cooked, great care being exercised that the naked hand does not touch the meat. A slit is made, and as much strychnine as would cover a three-penny bit inserted. A man could make hundreds of these baits in a day. They would then be distributed in likely places. A roasted leg of mutton dragged along, and baits dropped on the trail, have accounted for fourteen dogs on one line of baits in a couple of days, and, at the same time, numbers have died in the bulga scrub. Traps are useful if a path along which the dogs run is known. Care must be taken in handling the traps; otherwise the scent from the hands would be noticed by the dog. The trap should be operated so that the plate on which the lure is laid would be flush with the surface.

ANSWERS TO CORRESPONDENTS.

Airedale Terriers.

By the courtesy of Mr. J. Bain, Secretary of the Royal National Agricultural and Industrial Association of Queensland, we have obtained the addresses of the following reliable breeders of Airedale Terriers:—

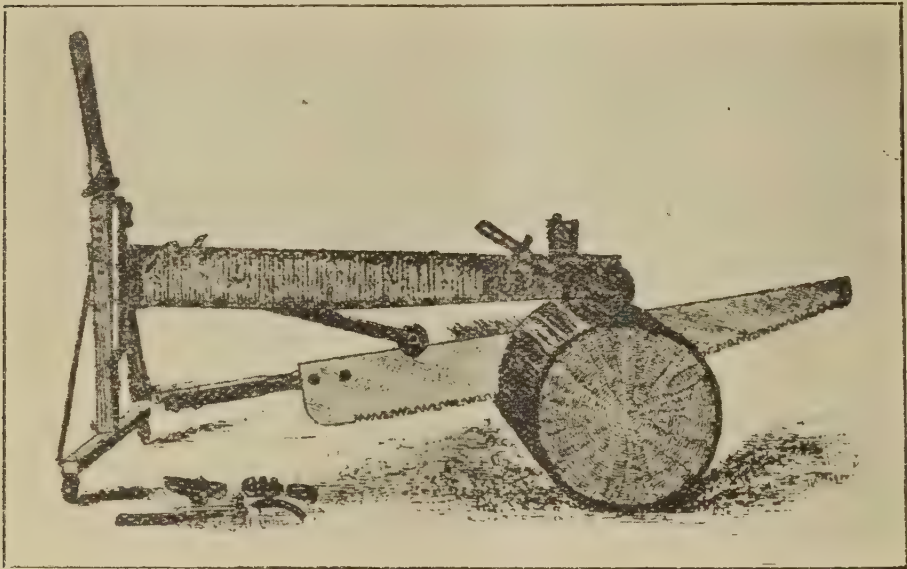
- J. Flynn, Surrey street, Red Hill, Brisbane.
- R. Smith, Baroona road, Rosalie.
- A. Ovenden, Tribune street, South Brisbane.

Re a Folding Saw.

RICHARD S. HEAPE (Buderim Mountain).—

We regret that, so far, we have no information concerning the folding saw illustrated in this Journal in November, 1899. At that time Messrs. James McEwan and Co., Elizabeth street, Melbourne, were makers and agents for the machine. Herewith we furnish the only illustration of it we have seen. It was claimed that any man accustomed to the machine can take it from his shoulder, unfold it, arrange it for sawing down a tree, change it back for sawing off a log, and change it again for sawing on a hillside. It was warranted to stand steady and work on any ground where two men can stand to run a crosscut saw, and to saw any kind of timber from 1 inch to 5½ feet in diameter. No matter how rough the ground may be, or at what angle the log may lie—say, at an angle of 45 deg. one way, and the ground where the machine is to be set the same degree (45) the other way—the machine can be adjusted instantly to suit the ground, log,

and direction desired to saw, without a moment's time being lost in setting the machine. Only one man is needed to run it. We may state that we obtained our information from the "Town and Country Journal."



REPORT ON EGG-LAYING COMPETITION, QUEENSLAND AGRICULTURAL COLLEGE, MAY, 1922.

The weather during the month was very unfavourable for egg production, owing to the cold westerly winds. There were odd cases of broodiness amongst the heavy breeds, also a good many birds moulting, including four in one pen. There were a few cases of sickness and four deaths. These birds have been replaced. Green feed is very scarce, otherwise the feeding of the birds is all that can be desired. The following are the individual records:—

Competitors.	Breed.	May.	Total.
LIGHT BREEDS.			
*W. and G. W. Hindes	White Leghorns	89	296
*Bathurst Poultry Farm	Do.	82	280
*N. A. Singer	Do.	93	263
C. H. Singer	Do.	76	245
J. H. Jones	Do.	38	237
*Geo. Trapp	Do.	36	234
A. G. C. Wenck	Do.	59	234
*W. A. Wilson	Do.	58	226
*T. Fanning	Do.	78	223
*W. Becker	Do.	80	218
*Mrs. L. Andersen	Do.	67	216
*S. L. Grenier	Do.	38	213
J. Purnell	Do.	45	210
B. Hawkins	Do.	23	206
*O. Goos	Do.	44	205
*G. Williams	Do.	44	201
*H. Fraser	Do.	46	195
*J. W. Newton	Do.	52	194
*H. P. Clarke	Do.	50	189
*J. M. Manson	Do.	79	189

EGG-LAYING COMPETITION—*continued.*

Competitors.	Breed.	May.	Total.
LIGHT BREEDS— <i>continued.</i>			
*Mrs. E. White	White Leghorns ...	38	185
*R. Gill	Do.	70	179
E. Stephenson	Do.	33	179
A. Maslin	Do.	22	179
T. H. Craig	Do.	37	177
*R. C. Cole	Do.	45	176
*C. Goos	Do.	57	174
B. C. Bartlem	Do.	14	164
G. H. Richardson	Do.	36	162
N. J. Nairn	Do.	26	147
*E. A. Smith	Do.	59	147
*Oakleigh Poultry Farm	Do.	37	145
*F. Birchall	Do.	42	142
*J. W. Short	Do.	42	141
*C. M. Pickering	Do.	31	140
A. Anders	Do.	15	140
*M. F. Newberry	Do.	47	138
*Mrs. R. Hodge	Do.	55	135
E. Seymour	Do.	38	134
*Thos. Taylor	Do.	55	133
*R. C. J. Turner	Do.	28	126
Brampton Poultry Farm	Do.	5	99
H. Trappett	Brown Leghorn ...	4	72
Parisian Poultry Farm	Do.	1	11

HEAVY BREEDS.

*A. E. Walters	Black Orpingtons ...	67	280
Wombo Poultry Farm	Do.	42	265
Mrs. A. Kent	Do.	25	249
*R. Holmes	Do.	46	232
*H. M. Chaille	Do.	76	231
*R. Burns	Do.	52	225
J. Hutton	Do.	47	225
*T. Hindley	Do.	94	216
*Rev. A. McAllister	Do.	28	194
*E. F. Dennis	Do.	82	191
Mrs. A. E. Gallagher	Do.	57	174
Mrs. L. Maund	Do.	35	153
*Jas. Potter	Do.	34	147
*C. C. Dennis	Do.	92	143
Jas. Hitchcock	Do.	15	135
V. J. Rye	Do.	21	130
R. Innes	Do.	21	128
C. Rosenthal	Do.	34	127
A. Rosenthal	Do.	34	127
C. Doan	Do.	39	117
H. B. Stephens	Do.	40	116
W. C. Trapp	Do.	27	74
W. Becker	Chinese Langshans ...	40	69
*Parisian Poultry Farm	Black Orpingtons ...	20	69
*J. E. Smith	Plymouth Rocks ...	13	24
R. Burns	Silver-laced Wyandottes	2	21
*Miss L. Hart	Rhode Island Reds ...	0	1
Total ... ..	...	3,063	11,836

* Indicates that the pen is being tested singly.

DETAILS OF SINGLE PEN TESTS.

Competitors.	A.	B.	C.	D.	E.	F.	Total.
LIGHT BREEDS.							
W. and G. W. Hindes	64	38	56	48	55	35	296
Bathurst Poultry Farm	40	31	52	54	66	37	280
N. A. Singer	33	52	41	45	40	52	263
G. Trapp	48	25	40	46	39	36	234
W. A. Wilson	32	30	29	51	37	47	226
T. Fanning	18	57	37	43	59	9	223
W. Becker	35	17	53	30	31	52	218
Mrs. L. Andersen	49	20	40	39	31	37	216
S. L. Grenier	35	16	42	40	39	41	213
O. Goos	34	23	35	50	38	25	205
G. Williams	29	38	39	32	29	34	201
H. Fraser	34	44	31	33	22	31	195
J. W. Newton	50	45	33	17	35	14	194
H. P. Clarke	36	18	32	36	37	30	189
J. M. Manson	37	20	37	12	48	35	189
Mrs. E. White	39	11	28	28	42	37	185
R. Gill	35	35	40	22	14	33	179
R. C. Cole	35	38	44	5	29	25	176
C. Goos	19	21	17	32	45	40	174
E. A. Smith	39	16	38	29	9	16	147
Oakleigh Poultry Farm	32	13	24	30	11	35	145
F. Birchall	24	24	7	28	31	28	142
J. W. Short	28	25	29	24	6	29	141
C. M. Pickering	36	35	12	20	22	15	140
M. F. Newberry	23	3	21	51	12	28	138
Mrs. R. Hodge	45	0	18	21	31	20	135
Thos. Taylor	34	8	31	25	24	11	133
R. C. J. Turner	22	14	30	29	24	7	126

HEAVY BREEDS.

A. E. Walters	42	43	59	36	49	51	280
R. Holmes	27	54	35	37	36	43	232
R. Burns	31	46	23	45	39	41	225
H. M. Chaille	56	35	44	42	37	17	231
T. Hindley	23	42	6	65	67	13	216
Rev. A. McAllister	34	40	55	19	9	37	194
E. F. Dennis	40	27	50	2	28	44	191
J. Potter	17	24	42	23	31	10	147
C. C. Dennis	26	35	32	11	27	12	143
Parisian Poultry Farm	2	11	27	6	12	11	69
J. E. Smith	0	2	7	0	11	4	24
Miss L. Hart	0	0	1	0	0	0	1

CUTHBERT POTTS,
Principal.

CERTIFICATES OF SOUNDNESS.

Certificates of Soundness were issued for the following Stallions during the month of June, 1922:—

Name of Stallion.	Breed.	Period for which Certificate was issued.	Owner's Name.	Owner's Address.
Sir William ..	Draught	Life ..	W. Holland ..	Braemar, Bundaberg
Patalster ..	Blood	Life ..	W. R. Bowman	Solicitor, Brisbane
Attaboy ..	Pony	Life ..	J. Healy ..	Maryborough street, Bundaberg
Don Car ..	Trotter	Life ..	G. Higgs ..	Toogoolawah
Tinta ..	Coacher	12 months	J. Leiper ..	Avondale

Farm and Garden Notes for August.

Land which has been lying fallow in readiness for early spring sowing should now be receiving its final cultivation prior to seeding operations. Potato-planting will be in full swing this month, and in connection with this crop the prevention of fungoid diseases calls for special attention. Seed potatoes, if possible, should be selected from localities which are free from disease; they should be well sprouted, and, if possible, should not exceed 2 oz. in weight. Seed potatoes of this size are more economical to use than those large enough to necessitate cutting. If, however, none but large-sized seed are procurable, the tubers should be cut so that at least two well developed eyes are left. The cut surfaces require to be well dusted with slacked lime, or wood ashes, as soon as possible after cutting. Where it is necessary to take action to prevent possible infection by fungoid disease, the dipping of potatoes in a solution of 1 pint of 40 per cent. formalin to 15 gallons of water, and immersing for one hour, will be found effective. Bags intended for the subsequent conveyance of tubers to the paddock should also be treated and thoroughly dried. After dipping, spread out the potatoes and thoroughly dry them before re-bagging. Where the tubers are cut, the dipping is, of course, carried out prior to cutting.

Arrowroot, yams, ginger, and sugar-cane may be planted this month in localities where all danger from frosts is over.

Maize may be sown as a catch crop, providing, of course, that sufficient soil moisture is available.

Sweet-potato cuttings may also be planted out towards the end of the month.

Weeds will now begin to assert themselves with the advent of warmer weather; consequently cultivators and harrows should be kept going to keep down weed growths in growing crops and on land lying fallow, as well as on that in course of preparation for such crops as sorghums, millets, or panicums, maize, and summer-growing crops generally.

Tobacco seed may be sown on previously burnt and well prepared seed-beds.

Kitchen Garden.—Nearly all spring and summer crops can now be planted. Here is a list of seeds and roots to be sown which will keep the market gardeners busy for some time: Carrots, parsnip, turnip, beet, lettuce, endive, salsify, radish, rhubarb, asparagus, Jerusalem artichoke, French beans, runner beans of all kinds, peas, parsley, tomato, egg-plant, sea-kale, cucumber, melon, pumpkin, globe artichokes. Set out any cabbage plants and kohlrabi that are ready. Towards the end of the month plant out tomatoes, melons, cucumbers, &c., which have been raised under cover. Support peas by sticks or wire-netting. Pinch off the tops of broad beans as they come into flower to make the beans set. Plough or dig up old cauliflower and cabbage beds, and let them lie in the rough for a month before replanting, so that the soil may get the benefit of the sun and air. Top dressing, where vegetables have been planted out, with fine stable manure has a most beneficial effect on their growth, as it furnishes a mulch as well as supplies of plant food.

Flower Garden.—All the roses should have been pruned some time ago, but do not forget to look over them occasionally, and encourage them in the way they should go by rubbing off any shoots which tend to grow towards the centre. Where there is a fine young shoot growing in the right direction, cut off the old parent branch which it will replace. If this work is done gradually it will save a great deal of hacking and sawing when next pruning season arrives. Trim and repair the lawns. Plant out antirrhinums (snapdragon), pansies, hollyhocks, verbenas, petunias, &c. Sow zinnias, amaranthus, balsam, chrysanthemum, marigolds, cosmos, coxcombs, phloxes, sweet peas, lupins; and plant gladiolus, tuberose, amaryllis, pincratium, ismene, crinums, belladonna, lily, and other bulbs. In the case of dahlias, however, it will be better to place them in some warm, moist spot, where they will start gently and be ready to plant out in a month or two. It must be remembered that this is the driest of our months. During thirty-eight years the average number of rainy days in August was seven, and the mean average rainfall 2.63 in., and for September 2.07 in., increasing gradually to a rainfall of 7.69 in., in February.

Orchard Notes for August.

THE COAST DISTRICTS.

The remarks that have appeared in these notes during the last few months respecting the handling and marketing of citrus fruits apply equally to the present month. The bulk of the fruit, with the exception of the latest ripening varieties in the latest districts, is now fully ripe, and should be marketed as soon as possible, so that the orchards can be got into thorough order for the Spring growth. All heavy pruning should be completed previous to the rise in the sap; and where Winter spraying is required, and has not yet been carried out, no time should be lost in giving the trunks, main branches, and inside of the trees generally a thorough dressing with lime and sulphur wash.

Where citrus trees are showing signs of failing, such as large quantities of dead or badly diseased wood in the head of the tree, they can (provided the root system is healthy) be renovated by cutting back the entire top of the tree till nothing but sound healthy wood is left. This should be thinned out, only sufficient main limbs being left from which to form a well-balanced tree, and the trunk and limbs so left should receive a dressing of lime sulphur, or Bordeaux paste.

Healthy trees that are only producing inferior fruit should be treated in a similar manner, and be either grafted with an approved variety direct or be allowed to throw out new growth, which can be budded in due course. The latter method is to be preferred, and an inferior and unprofitable tree can thus be converted in the course of a couple of years into a profitable tree, producing good fruit.

Where orchards have not already been so treated, they should now be ploughed so as to break up the crust that has been formed on the surface during the gathering of the crop, and to bury all weeds and trash. When ploughed, do not let the soil remain in a rough, lumpy condition, but get it into a fine tilth, so that it is in a good condition to retain moisture for the tree's use during Spring. This is a very important matter, as Spring is our most trying time, and the failure to conserve moisture then means a failure in the fruit crop, to a greater or lesser extent.

Do not be afraid if you cut a number of surface roots when ploughing the orchard, but see that you do cut them, not tear them. Use a disc plough and keep the discs sharp, and the root-pruning the trees will thus receive will do more good than harm, as it will tend to get rid of purely surface roots.

Planting of all kinds of fruit trees can be continued, though the earlier in the month it is completed the better, as it is somewhat late in the season for this work. The preparation of land intended to be planted with pineapples or bananas should be attended to, and I can only reiterate the advice given on many occasions—viz., to spare no expense in preparing the land properly for these crops—as the returns that will be obtained when they come into bearing will handsomely repay the extra initial expense. Growers of pineapples and bananas who send their fruit to the Southern markets should take more care in the grading and packing of such fruit, as their neglect to place it on the market properly means a big difference in price, and entails a loss that could be avoided had the necessary care and attention been given. The same remarks apply to the marketing of citrus fruits, pawpaws, custard apples, strawberries, cucumbers, and tomatoes, all of which are in season during the month.

The pruning of all grape vines should be completed, and new plantings can be made towards the end of the month. Obtain well-matured, healthy cuttings, and plant them in well and deeply worked land, leaving the top bud level with the surface of the ground, instead of leaving 6 or 7 in. of the cutting out of the ground to dry out, as is often done. You only want one strong shoot from your cutting, and from this one shoot you can make any shaped vine required. Just as the buds of the vine begin to swell, but before they burst, all varieties should be dressed with sulphuric acid solution, composed of three-quarters of a pint of commercial sulphuric acid to one gallon of water; or, if preferred, this mixture can be used instead—viz., dissolve 5 lb. of sulphate of iron (pure copperas) in one gallon of water, and when dissolved add to it half a pint of sulphuric acid. This is the winter treatment for the prevention of anthracnose or black spot, and for downy mildew, and should on no account be neglected.

Fruit-fly will make its appearance during the month, and citrus and other fruits are likely to be attacked. Every grower should, therefore, do his best to destroy as many flies as possible, both mature insects and larvæ, the former by trapping or otherwise, and the latter by gathering and destroying all infested fruit. If this work is carried out properly, a large number of flies that would otherwise breed out will be destroyed, and the rapid increase of the pest be materially lessened. The destruction of fruit-flies early in the season is the surest way of checking this serious pest.

Keep a careful lookout for orange-sucking bugs, and destroy every mature or immature insect or egg that is seen. If this work is done thoroughly by all citrus growers there will be far fewer bugs to deal with later on, and the damage caused by this pest will be materially reduced. Destroy all elephant beetles seen on young citrus trees, and see that the stems and main forks of the trees are painted with a strong solution of lime sulphur.

THE GRANITE BELT, SOUTHERN AND CENTRAL TABLELANDS.

The pruning of all deciduous trees should be finished during the month, and all such trees should be given their annual winter spraying with lime sulphur. The planting of new orchards should, if possible, be completed, as it is not advisable to delay. Later planting can be done in the Granite Belt, but even there earlier planting is to be preferred.

Peach trees, the tops of which have outlived their usefulness and of which the roots are still sound, should be cut hard back so as to produce a new top which will yield a good crop of good fruit the following season in from fifteen to eighteen months, according to the variety.

Apple, pear, or plum trees that it is desirable to work over with more suitable varieties should also be cut hard back and grafted. All almond, peach, nectarine, and Japanese plum trees should be carefully examined for black peach aphid, as, if the insects which have survived the Winter are systematically destroyed, the damage that usually takes place from the ravages of this pest later on will be materially lessened.

Woolly aphid should also be systematically fought wherever present. The best all-round remedy for these two pests is spraying with black leaf 40.

In the warmer parts of these districts the pruning of grape vines should be completed, and they should receive their Winter dressing for black spot and downy mildew, as recommended for the Coast. In the Granite Belt the pruning of vines should, however, be delayed to as late in the season as possible, so as to keep the growth back and thus endeavour to escape late Spring pests.

Where orchards and vineyards have been pruned and sprayed, the land should be ploughed and brought into a state of as nearly perfect tilth as possible, so as to retain the moisture necessary for the proper development of the trees or vines and the setting of their fruit.

ASTRONOMICAL DATA FOR QUEENSLAND.

TIMES COMPUTED BY D. EGLINTON, F.R.A.S.

TIMES OF SUNRISE AND SUNSET.

AT WARWICK.

1922.	JULY.		AUGUST.		SEPTEMBER.	
	Rises.	Sets.	Rises.	Sets.	Rises.	Sets.
1	6.45	5.6	6.36	5.20	6.7	5.37
2	6.45	5.6	6.35	5.21	6.6	5.38
3	6.45	5.7	6.35	5.21	6.5	5.38
4	6.45	5.7	6.34	5.22	6.4	5.38
5	6.45	5.8	6.33	5.23	6.3	5.39
6	6.45	5.8	6.32	5.24	6.2	5.39
7	6.45	5.9	6.31	5.24	6.1	5.40
8	6.45	5.9	6.30	5.25	6.0	5.40
9	6.44	5.10	6.29	5.26	5.58	5.41
10	6.44	5.10	6.28	5.27	5.57	5.41
11	6.44	5.10	6.28	5.28	5.56	5.42
12	6.44	5.11	6.27	5.28	5.55	5.42
13	6.43	5.11	6.26	5.29	5.53	5.43
14	6.43	5.12	6.25	5.29	5.52	5.44
15	6.43	5.12	6.24	5.30	5.51	5.45
16	6.42	5.13	6.23	5.30	5.50	5.45
17	6.42	5.13	6.22	5.31	5.49	5.46
18	6.42	5.14	6.21	5.31	5.48	5.46
19	6.41	5.14	6.21	5.32	5.47	5.46
20	6.41	5.15	6.20	5.32	5.46	5.46
21	6.41	5.15	6.19	5.32	5.44	5.46
22	6.40	5.16	6.18	5.33	5.43	5.47
23	6.40	5.16	6.17	5.33	5.42	5.47
24	6.39	5.17	6.16	5.34	5.41	5.47
25	6.39	5.17	6.15	5.34	5.40	5.48
26	6.38	5.18	6.14	5.35	5.39	5.48
27	6.38	5.18	6.13	5.35	5.38	5.49
28	6.37	5.19	6.12	5.36	5.37	5.49
29	6.37	5.19	6.11	5.36	5.36	5.50
30	6.36	5.20	6.10	5.37	5.35	5.50
31	6.36	5.20	6.9	5.37	...	...

PHASES OF THE MOON, OCCULTATIONS, &c.

The times stated are for Queensland, New South Wales, Victoria, and Tasmania when "Summer Time" is not used.

		H. M.
2 July	☾ First Quarter	8 52 a.m.
9 "	☉ Full Moon	1 7 p.m.
17 "	☾ Last Quarter	3 11 p.m.
24 "	☾ New Moon	10 47 p.m.
31 "	☾ First Quarter	2 22 p.m.

Apogee on the 15th at 3.24 a.m.

Perigee on the 27th at 1.30 a.m.

About 8 o'clock in the evening of 29th July the apparent nearness of the Moon and the giant planet Jupiter low down in the west will form a very interesting spectacle; there will be an occultation of Jupiter about 9 o'clock.

8 Aug.	☉ Full Moon	2 19 a.m.
16 "	☾ Last Quarter	6 46 a.m.
23 "	☾ New Moon	6 34 a.m.
29 "	☾ First Quarter	9 55 p.m.

Apogee on the 11th at 6.54 p.m.

Perigee on the 24th at 5.42 a.m.

During the evenings of 14th, 15th, and 16th August the planets Venus and Saturn will, with Eta Virginis, a second magnitude star, form an interesting group in the north-west.

6 Sept.	☉ Full Moon	5 47 p.m.
14 "	☾ Last Quarter	8 20 p.m.
21 "	☾ New Moon	2 38 p.m.
28 "	☾ First Quarter	8 40 a.m.

Apogee on the 8th at 4.12 a.m.

Perigee on the 21st at 3.36 p.m.

About 3 o'clock on the afternoon of 30th September a pair of binoculars should afford a view of the Moon and a third magnitude star—Beta Capricorni. In the course of an hour the star may be seen in a small telescope to disappear suddenly on the eastern side of the Moon and reappear on its western side.

The planet Venus will be at its greatest height in the western sky on 15th and 16th September.

The Great Australian Solar Eclipse will occur on 21st September between a few minutes after 3 p.m. to about a quarter past 5.

For places west of Warwick and nearly in the same latitude, 28 degrees 12 minutes S., add 4 minutes for each degree of longitude. For example, at Inglewood, add 4 minutes to the times given above for Warwick; at Goondiwindi, add 8 minutes; at St. George, 14 minutes; at Cunnamulla, 25 minutes; at Thargomindah, 33 minutes; and at Oontoo, 43 minutes.

The moonlight nights for each month can best be ascertained by noticing the dates when the moon will be in the first quarter, and when full. In the latter case the moon will rise somewhat about the time the sun sets, and the moonlight then extends all through the night; when at the first quarter the moon rises somewhere about six hours before the sun sets, and it is moonlight only till about midnight. After full moon it will be later each evening before it rises, and when in the last quarter it will not generally rise till after midnight.

It must be remembered that the times referred to are only roughly approximate, as the relative positions of the sun and moon vary considerably.

[All the particulars on this page were computed for this Journal, and should not be reproduced without acknowledgment.]

Queensland

Department of Agriculture and Stock

Volume XVIII



AUGUST, 1922

Queensland Agricultural Journal



**REGISTERED AT THE GENERAL POST OFFICE, BRISBANE,
FOR TRANSMISSION BY POST AS A NEWSPAPER.**

**Edited by
J. F. F. REID**

PROFITS

That's another way
of spelling

DIABOLO

Dairymen who want Bigger Profits use the "DIABOLO"—the Separator that gives a bigger cream yield. The Diabolo Bowl is so perfectly balanced that cream cannot possibly slip away. Added to this it is simple in construction, easy to operate—easy to clean. Don't accept a substitute. Buy a Diabolo, the world's best Separator.

WRITE FOR DESCRIPTIVE BOOKLET.

Diabolo Separator Co., Ltd.,

Creek Street, BRISBANE.



SEED MAIZE

of all the leading varieties for present planting. All nice samples, topped and tailed, and true to name.

SUDAN GRASS—*The Wonder Crop*

As a drought resister Sudan has proved itself one of the best. Cut green, or in the form of hay, it is relished by all stock, and its fodder value compares most favourably with wheaten or lucerne hay. Write for quotation, if interested.

SEED POTATOES, nice seed size, nicely shooting, all ready for immediate planting, of the following varieties—Carmens, Brownell Beauties, Guyra Blues, Satisfactions, etc.

Also *Japanese Millet, Panicum, White Panicum, Sorghum, Paspalum, Rhodes Grass, Saccaline, etc.*

Cow Peas for green manuring. We are still booking orders for *Fruit Trees* of all kinds; *Citrus Trees, Rose Trees*, of every description.

Vegetable and Flower Seeds of all kinds for the farm and garden.

CHARLES TAYLOR & Co.

"THE LEADING SEEDSMEN"

124-128 ROMA STREET, BRISBANE

Registered at the General Post Office for Transmission by Post as a Newspaper.]



THE
QUEENSLAND AGRICULTURAL JOURNAL,

ISSUED BY DIRECTION OF

THE HON. THE SECRETARY FOR AGRICULTURE.

EDITED BY J. F. F. REID.

VOL. XVIII. PART 2.

AUGUST.

By Authority:

ANTHONY JAMES CUMMING, GOVERNMENT PRINTER, BRISBANE,

1922.

We are Bag Specialists

For Farmers—For Farmers—For Farmers

Bags for Wheat, Maize, Chaff, Peas, Beans, etc.
Any sort or kind.

New or Second Hand.

**For Storekeepers, Meat Exporters, Flour
Millers, Bacon Curers, etc.**

All kinds of Hessian and Calico Bags Printed to
your own design.

For Packing, Signwriting, Plastering, etc.

Hessian and Calico all widths and grades.

Joyce Bros. (Q.) Limited

Stanley Street, South Brisbane

The Forster Engineering Works

SPEAKING OF REPAIRS?

We Specialise in Repairs of every description, particularly Machine-cut Gears in Iron, Steel, Gun Metal, Raw-hide, etc.

Horse and Cattle Brands made; also Ploughs and Ploughshares made and repaired. Inquiries for any class of Machinery will receive prompt and special attention.

Write for particulars.

Forster Engineering Works Ltd.

Engineers and Blacksmiths,

Mary Street (between George and Albert Streets), Brisbane.

A Business Proposition

IT is in your interests to support an Institution established for the benefit of the people of Queensland; **therefore**, consult **The Public Curator**, whose Office exists for your benefit, in all matters relating to the making of Wills (free of charge), Administration of Estates, taking over Existing Trust Estates, carrying on businesses as Attorney, lending money on First Mortgage of Real Estate, giving legal advice free, registering Transfers, preparation of Agreements, &c.

Branch Offices at **ROCKHAMPTON**
and **TOWNSVILLE**, and Agencies
at all Court Houses in Queensland.

F. W. MOLE,
Public Curator,
BRISBANE.

CONTENTS.

	Page.		Page.
Organisation of the Agricultural Industry	65	EVENT AND COMMENT— <i>continued.</i>	
The Director, Queensland Producers' Association	72	Sugar Exhibits at the Brisbane Show	120
Cassava Growing and Manufacture ...	75	Beerburum Fruit — Returned Soldiers' Success	120
A Summary of Experiments Carried out by the Bureau of Sugar Experiment Stations.—III. (H. T. Easterby)	75	The Bee-eater	120
Sugar: Field Reports	81	New Market for Meat	121
The Sugar-growing Districts of North Queensland (H. T. Easterby) ...	84	Defrosting Meat	121
Cane Pest Combat and Control ...	87	The Raw Cotton Situation	122
The 1922 Sugar Estimate	89	The Brisbane Show: Departmental Court	122
Queensland Trees (C. T. White, F.L.S.)	89	Australian Fruit in England ...	122
A Chillagoe Orchard (E. B. Freeman)	92	American Prices—Staple Cotton ...	123
The Scrub and Forest Lands of Queensland (A. J. Boyd)	93	A View of the American Cotton Crop Outlook	123
A Native Fodder Tree from North Queensland (C. T. White, F.L.S.)	96	Boll Weevil and Overflows	124
Electric Mechanical Cotton-picker ...	99	Next Year's Cotton Consumption	124
Basic Slag Problems	100	Recapitulation of Cotton Exports from the United States for 100 Years	125
The Human Machine on the Land ...	101	Rainfall in the Agricultural Districts	125
Protection of Sheep from Blowflies ...	102	Production, Prospects, and Prices—	
Purity and Germination of Agricultural Seeds (F. F. Coleman) ...	104	Agriculture	126
Seed Maize for Sale	107	Fat Stock	126
Horticultural Notes (E. W. Bick) ...	108	Fruit and Vegetables	126
Ripening Bananas in Air-tight Chambers	109	General Notes—	
Grape Culture in Queensland (A. H. Benson)	109	Guarantee to Cotton-growers ...	127
The Dairy Herd, Queensland Agricultural College, Gatton	117	Publication Received	127
The Mystery of "Roaring Rails" ...	117	Destroying Ants	127
Table of Cane Values	118	Manufacture of Motor Spirit ...	127
Editorial Notes—		Queensland Agricultural College Bursaries	127
New Agricultural Legislation ...	119	The Boll Weevil	127
Primary Producers' Organisation Bill	119	Forestry Legislation and Education	128
Agricultural Education Bill ...	119	An Effective Crow Trap	128
A Bill to Amend the Fruit Cases Act	119	The Public Curator	129
Event and Comment—		Interstate Fruit Specials	129
Federal Guarantee for Cotton ...	120	Arsenic as a Cotton Pest Killer ...	129
		Answer to Correspondent—	
		Cockroaches and their Extermination	130
		Show Dates, 1922 and 1923	130
		Fruit Fly Investigations	131
		Orchard Notes for September ...	134
		Farm and Garden Notes for September	136
		Certificates of Soundness	137
		Astronomical Data for Queensland ...	138
		Departmental Announcements	xiii.

Queenton Seeds We Grow

Early Jewel and Ponderosa Tomato, Sugar Melon,
Giant Rock Melon, Iceberg Lettuce, Giant Rhubarb,
White Spine Cucumber, Rosella, Crested Cosmos,
Giant and Striped Zinnia, Double and Single
Dianthus, Phlox, Calendula, Sweet Peas, etc.

All 6d. per packet

SEED LIST ON APPLICATION

E. MANN & SON

Seed Growers

Charters Towers



—TRUE
VALUE

PIKE BROTHERS'
Famous Khaki
DINGO MOLE
RIDING
TROUSERS

40/-

Per Pair

"THERE'S NONE SO SERVICEABLE"

DINGO MOLE defies the Saddle rubbing—it has an obstinate surface—a quality that will not wear out. They will wear so long that you'll almost forget the day you bought them.

Q Then there is the finer Tailoring that accounts for much—the superior trimmings help too, and the fitting, well—skilful cutting gives that correctness for saddle comfort and service, which is all to the "Man of the Saddle."

WRITE TO
DESK A.J.

SEND FOR PATTERNS
AND SELF-
MEASUREMENT
FORM

PIKE BROTHERS
LIMITED
BRISBANE

Townsville

Toowoomba

QUEENSLAND AGRICULTURAL JOURNAL

VOL. XVIII.

AUGUST, 1922.

PART 2.

ORGANISATION OF THE AGRICULTURAL INDUSTRY.

Activities of the Provisional Council of Agriculture.

A Record of Progress and Achievement.

The Fourth Meeting of the Provisional Council of Agriculture was held on 20th July, and a complete record of its Proceedings is set out hereunder.

I.

The fourth meeting of the Provisional Council of Agriculture was held on 20th July, 1922.

Since the previous meeting of the Provisional Council, the Administrative Standing Committee had met twice—namely, on 28th June and 12th July; the Dairying Standing Committee had met on 13th and 14th July, and the Fruit Standing Committee had met on 12th July. The Transport Standing Committee held its first meeting on 13th July, when Mr. J. W. Davidson (Commissioner for Railways) was appointed Chairman.

The Administrative Committee reported that, under authority of a resolution passed at the last Council meeting, the Committee had taken the necessary steps to appoint Provisional Organisers, as follows:—

No. of District.	Electoral Divisions Comprised.	Name of Organiser.
1	Cairns, Chillagoe, Cook, Eacham, Herbert	Mr. Harvey Jurd
2 and 3	Bowen, Kennedy, Mundingburra, Townsville, Charters Towers, Queenton	Mr. D. V. Hannay
5 and 6	Fitzroy, Mt. Morgan, Normanby, Keppell, Port Curtis, Rockhampton	Mr. T. Ritchie
7	Bundaberg, Burnett, Musgrave	Mr. R. J. Webster
8	Burrum, Gympie, Maryborough, Nanango	Mr. T. J. O'Connell
9	Coorooka, Wide Bay	Mr. A. S. Douglas
10A	Aubigny, Ipswich, Lockyer, Bremer ..	Mr. J. S. Mickan
10B	Cunningham	Mr. J. McMaster
11	Bulimba, Logan, Murrumba, Nundah, Oxley, Stanley (also <i>pro forma</i> Metropolitan Constituencies)	Mr. J. F. Dowd
12	Albert, Fassifern, Rosewood	Mr. R. Wight
13A	Pittsworth, Toowoomba, Toowoomba East	Mr. W. T. Harris
13B	Drayton	Mr. W. Gargett
14	Carnarvon, Warwick	Mr. W. Ranger
15	Dalby, Maranoa, Murilla	Mr. H. McAnally

The Council passed the following resolutions:—

Provisional Organisers—

- (1.) That the action taken by the Administrative Committee in this matter be confirmed.
- (2.) That in view of the fact that District No. 4 (Mackay and Mirani) is already well organised from the producers' viewpoint, the canegrowers' representatives on each of the Local Cane Prices Boards be asked to convene meetings for the purpose of forming Local Producers' Associations, subsequently appointing delegates to the District Council.
- (3.) That in respect to canegrowers in other districts, arrangements similar to those indicated in (2.) above be made, as far as practicable, thus enabling the provisional organisers to concentrate more fully on the primary industries still to be organised.
- (4.) That the purport of (3.) above be suitably communicated to the Provisional Organisers; and that they be asked to act in accordance with the spirit thereof.

Council Delegates—

- (5.) That, as the provisional organisers have now been appointed, and it will no longer be necessary for the Council to avail itself of the services of the Council delegates, they be cordially thanked for their services in visiting districts and making known the aims and objects of the scheme for the organisation of the agricultural industry.

Chief Dairy Expert—Membership, Provisional Council—

- (6.) That it is noted that the Dairy Committee strongly urges the appointment of Mr. E. Graham, Chief Dairy Expert, as a member of the Provisional Council of Agriculture and of the Dairying Standing Committee, in view of—
 - (a) His expert knowledge of the problems connected with all phases of the dairying industry;
 - (b) The advantage to the dairying community of having him closely associated with the business transactions of the Council.
- (7.) That in view of the above circumstances it be a recommendation to the Government to appoint Mr. Graham as a member of the Provisional Council.
- (8.) That it is noted that, following upon the Conference with the Premier on the 15th June, 1922, the Dairying Industry Advisory Board was disbanded; that Messrs. Douglas, McAnally, and Sloan had retired from the Council; and that Messrs. J. E. Dean, H. Keefer, W. Purcell, and T. Plunkett (formerly members of the Dairying Industry Advisory Board) were appointed as dairy representatives on the Provisional Council.

Personnel, Certain Committees—

- (9.)—
 - (a) That in view of the retirement from the Council of Mr. Douglas, Mr. McAnally, and Mr. Sloan, their names be removed from the list of members of the Standing Committees to which they were appointed.
 - (b) That it is noted that the personnel of the Dairy Committee is now as follows,—namely, Messrs. J. E. Dean, H. Keefer, J. Purcell, W. Purcell, T. Plunkett, and J. T. Tod, with Mr. E. Graham, Chief Dairy Expert, as associate member.
 - (c) That Mr. H. Keefer be appointed as a member of the Transport Committee, in the room of Mr. Douglas, retired.
 - (d) That Mr. T. Plunkett be appointed as a member of the Wheat and General Agriculture Committee, in the room of Mr. McAnally, retired.

Associate Members, Publicity Committee—

- (10.) That the Editor of the "Education Office Gazette" and the Editor of the "Queensland Government Mining Journal" be appointed as associate members of the Publicity Committee. (The Editor of the "Queensland Agricultural Journal" had been previously appointed a member of this Committee.)

Director, Queensland Producers' Association—

- (11) That, in the opinion of this Council, Mr. R. L. Macgregor is the most suitable candidate (from amongst the 72 applicants for the position) for appointment as Director of the Queensland Producers' Association.
- (12.) That it be reported to the Government that the Council unanimously recommends the appointment of Mr. R. L. Macgregor to the position in question, under the conditions outlined in the Primary Producers' Organisation Bill which is now before Parliament.

[Mr. Macgregor has telegraphed his acceptance of the position, and has been requested to take up duty as soon as possible.—Ed.]

II.

Activities of the Provisional Council in relation to Proposals for the benefit of producers.

1. *Income Tax Relief for Farmers—*

That in connection with a recommendation recently submitted by the Queensland Farmers' Alliance, to the effect that "any farmer whose farm is mortgaged and who is liable to pay more than £25 in interest per annum, and the unimproved value of whose property does not exceed £2,000, shall be allowed double the amount of interest payable as a deduction from Income Tax assessment," it is noted that advice has been received from the Under Secretary to the Treasury that in an amendment of the Land Tax Act which it is proposed to introduce during the current session of Parliament, certain relief will be given to farmers owning land.

2. *Herd-testing.*

- (a) That this Council, recognising the importance of the improvement of dairy herds by herd-testing, recommends that the services of officers of the Department of Agriculture and Stock be made available, to the fullest extent, to Associations formed for the purpose of furthering the principles of herd-testing;
- (b) That it be a recommendation that Mr. E. Graham, Chief Dairy Expert, be asked to prepare for submission to the next meeting of the Dairy Committee a concrete scheme to give effect to the foregoing recommendation;
- (c) That the Herd-testing Associations which conferred recently with the Dairy Committee be suitably advised to the foregoing effect.

3. *Factory returns required by the Department of Agriculture—*

That the Chief Dairy Expert be asked to give further consideration to the matter of returns supplied from factories relating to cream of low-grade quality.

4. *Dairy Inspectors—*

That the Council is of opinion that the present staff of dairy inspectors is not sufficiently large to cope with the volume of work entailed by the new Dairy Produce Act, and recommends that the Department of Agriculture be requested to appoint a number of additional inspectors.

5. *Cold Store at Hamilton—*

- (a) That the Minister for Works be urged to expedite the building of the cold stores, as the recent general rains make possible early and heavy production in the dairying industry, which will necessitate the provision of extensive storage.
- (b) That the four rooms which it is anticipated will be in readiness by December, should be utilised for the storage of dairy products. Fruit and other produce should be placed in the cold stores at Roma street.
- (c) That the Council is of opinion the control of cold stores at Hamilton should be vested in the Department of Agriculture and Stock.

6. *Minimum Load of Butter—*

That the Dairy Committee and the Transport Committee confer on the question of reducing the minimum truck load of butter from 3 to 2 tons.

7. *Question of Introduction of Co-operative Companies Bill—*

(a) That in view of arrangements already made by the Dairying Industry Advisory Board, representatives of co-operative companies be requested to meet the members of the Council in Conference on Friday, the 21st instant.

(b) That the Council be represented at the Conference by—

- (i.) The several members of the Dairy Committee;
- (ii.) Messrs. Ellison and Howe (fruit representatives);
- (iii.) Messrs. Batchelor, Powell, and Pritchard (sugar representatives).

8. *Plans of Dairy Buildings, &c.—*

That it be a recommendation to the Department of Agriculture to investigate and draw up plans and specifications (to be on the most economic and efficient basis) of dairy buildings, yards, pig-styes, sheds, milk stands, &c., with a view to making the plans available for distribution to dairy farmers; such buildings to comply with the provisions of the Dairy Produce Act.

9. *Conservation of Fodder—*

That the New South Wales Government be requested to furnish a copy of the scheme relating to the conservation of fodder, which it has now under consideration.

10. *Cream Containers—*

That the Co-operative Dairy Companies' Association be requested to investigate the matter of securing suitable rimless cream containers, with a view to recommending their adoption in place of kerosene tins at present widely in use.

11. *Director of Fruit Culture—*

(a) That the Council strongly recommends the appointment of a Chief Instructor of Fruit Culture to act as deputy to the Director, to perform a reasonable amount of field work and to assist in the adequate supervision of the field staff.

(b) That with a view to obtaining a suitable man the position be advertised throughout Australia.

12. *Citriculturist—*

That the Public Service Commissioner be requested to consult the Council of Agriculture when applications are being invited for this position.

13. *Visit of Tasmanian Government Fruit Expert—*

That as Mr. Ward, Tasmanian Government Fruit Expert, will be visiting Brisbane in August next, the Department of Agriculture be requested to endeavour to arrange for an extension of his visit to the Stanthorpe district and for a lecture by him on deciduous fruit growing.

14. *Banana Pool—*

(a) That the Department of Agriculture be requested to take a ballot of all banana growers in Queensland who have a minimum area of not less than 1 acre under bananas; and that the ballot papers contain the following questions:—

- (i.) Are you in favour of a Compulsory Banana Pool?
- (ii.) Would you approve of the Pool being conducted by the Southern Queensland Fruitgrowers' Society?

(b) That the growers be requested to return their ballot papers so as to reach the Department of Agriculture not later than the 31st August, and that they be asked to furnish at the same time—

- (i.) Name:
- (ii.) Address:
- (iii.) Number of acres under bananas:

15. *High Price of Fertilisers—*

That it is noted that the prices which are being charged to growers for manures are very high, and that the matter be brought suitably under the notice of the Prices Commissioner.

16. *Agricultural Machinery—*

That it be a recommendation to the Council that the several Standing Committees concerned list for discussion the matter of the high cost of agricultural machinery.

17. *Standards for Apples—*

- (a) That it is noted that the Stanthorpe District Council of Fruitgrowers has approved of following standards for apples:—

Grade A.—Apples to be well formed specimens of one variety, of uniform size, free from visible bitter pit, black spot, and hail marks, but case may contain not more than 10 per cent. of specimens with slight blemishes from insect and limb rub. Apples to be not less than $2\frac{1}{4}$ inches in diameter.

Grade B.—Apples to be free from visible bitter pit, black spot, and hail marks, but case may contain not more than 20 per cent. of specimens with blemishes from insect and limb rub. Apples to be not less than $2\frac{1}{4}$ inches in diameter.

Grade C.—Apples to be free from visible bitter pit and black spot, but case may contain 100 per cent. of specimens with insect, limb rub, and hail marks. Apples to be not less than 2 inches in diameter.

Grade D.—Apples to be free from visible bitter pit and black spot, but case may contain 100 per cent. of specimens with insect, limb rub, and hail mark. Apples to be not less than $1\frac{3}{4}$ inches in diameter.

Apples of Grades A, B, and C shall be properly packed according to the diagonal pack.

Apples of Grade D shall be so packed that the outer layer or shown surface shall be a true indication of the average grade of the fruit throughout the package.

The name of the variety and the size shall be marked on the outside of every case.

- (b) That it be a recommendation to the Department of Agriculture to take the necessary action to have these standards adopted.

18. *Rough Handling of Fruit—*

That it be a recommendation to the Department of Agriculture to introduce legislation to give effect to the following recommendations:—

- (a) No case or cases of fruit shall be stood or walked upon by any person except upon a plank of not less than 1 inch in thickness and 6 inches in width first placed on such case or cases for that purpose;
- (b) No person shall handle, stack, load, or unload any fruit whereby such fruit is subjected to shock sufficient, in the opinion of an inspector, to bruise or injure such fruit, whether such fruit be actually bruised or injured or not thereby.
- (c) Any person committing a breach of any regulations under "The [name of Act] Act" shall upon conviction be liable to a penalty not exceeding ten pounds.

19. *Diseases in Plants Act—*

That the following particulars be brought under the notice of the Department of Agriculture:—

- (a) The Council is satisfied that the Government has ample power under the Act to deal effectively with any disease, but considers that burying of fruit-fly-infested fruit is not a practically effective mode of destruction.
- (b) Section 5 of the Act, dealing with the appointment of inspectors, reads, "The Governor in Council may from time to time appoint such qualified persons as may be deemed necessary to be inspectors under this Act," &c. In the opinion of the Council the necessary qualifications should be laid down by regulations under this Act.

20. *Administration, Diseases in Plants Act—*

That it be a recommendation to the Department of Agriculture—

- (a) That regulations be issued defining the qualifications and duties of inspectors under this Act;
- (b) That no inspector be appointed in future until he has passed a practical examination in acknowledged methods of control of diseases and pests, and that he be certified accordingly;
- (c) That the Entomological Branch each month supply to the "Queensland Agricultural Journal" an article or current notes upon all particular diseases and pests which may require treatment, and the nature of that treatment during the ensuing month;
- (d) That inspectors have full powers to compel a grower to pick up and destroy all fallen fruit—at once if necessary;
- (e) That inspectors have full powers for carrying out an immediate prosecution; but to avoid victimisation, it is advisable when practicable to call in another inspector or competent officer as a witness;
- (f) That it is desirable that the Council of Agriculture should be consulted when appointments of inspectors are being made.
- (g) That the Stanthorpe district be divided into three areas, and one Diseases in Plants Act inspector be resident in and responsible for each area;
- (h) That a speedier mode of travelling be recommended. The use of motor cycles is desirable.

21. *"Bunchy Top" in Bananas—*

That in view of the particulars contained in a recent letter from the Secretary, Currumbin Fruitgrowers' Association, the Department of Agriculture be requested to cause immediate inquiries to be made into Mr. Marks's claim that he has discovered the cause and cure for "bunchy top" in bananas.

22. *Railway Trucks—Carriage of Fruit—*

That the following particulars be noted from the Progress Report of the Transport Committee:—

- (a) That there are now 496 louvered wagons in use in Queensland, that thirty more are under construction, and that all box wagons built in future will be of the louvered type.
- (b) That the New South Wales Railway Department also uses louvered wagons, but because of the colder climate in the New England district tarpaulins are used to cover the fruit in the leading ends of the wagons in winter time.
- (c) That a request will be made by the Railway Department of this State to the New South Wales authorities to extend the covering to the sides as well.

23. *Shipping Shed at Wallangarra—*

- (a) That it is noted from the report of the Transport Committee that the bulk of the fruit arrives at Wallangarra in train loads and is taken away in train loads, the Queensland wagons being placed opposite those of New South Wales. The building of a shed to cover the whole of the tranship road which would be necessary to avoid shunting would be very costly. The rainfall records at Wallangarra are not high.
- (b) That it is noted that the Commissioner for Railways will make inquiries regarding the supplying of collapsible covers to protect the fruit during the course of transhipment.

24. *Railway Checkers at Loading Centres—*

That it is noted from the report of the Transport Committee that, where the railway staff is available, clean receipts will be given for consignments. To provide checkers at every small station would necessitate increased charges, but senders' count receipts will be eliminated as far as possible.

25. *Conveyance of Fruit to Western Australia—*

- (a) That it is noted that the railway freight between Brisbane and Perth will be £10 11s. 6d. per ton plus inspection fees in 6-ton lots.

- (b) That it is also noted that the Commissioner for Railways will make further inquiry as to the time necessary for the conveyance of fruit where inspection charges will be levied in all the States.

26. *Delay—Consigning of Fruit to Adelaide—*

That it is noted that this matter is in the hands of the Victorian and South Australian railway authorities.

27. *Railway Rates for Fertilisers—*

- (a) That in connection with this matter the following circumstances have been noted:—Comparison of Queensland rates with those of New South Wales shows that up to 200 miles the comparison is favourable to Queensland, but over 200 miles the comparison is more in favour of New South Wales.

In the latter State there cannot be much traffic over long distances, so that the advantage in the rates would not be much availed of.

- (b) That it is also noted that the Transport Committee has agreed that the Chairman (the Commissioner for Railways) should recommend a reduction of 15 per cent. in the Queensland rates for distances over 200 miles, but not less than the present rate for 200 miles.
- (c) That the Transport Committee be asked to give further consideration to this matter at a later date, with a view to ascertaining whether a still further reduction may be possible in the direction indicated.

28. *Use of Refrigerated Trucks for Fly Infected Fruit—*

- (a) That in connection with a request from the Stanthorpe district for refrigerated cars for the conveyance of stone fruit from Stanthorpe to Brisbane, it is noted that the Transport Committee is of opinion that, if refrigerated wagons are provided, higher rates should be charged. Such wagons would be required in the height of the butter season and the Railway Department has no refrigerated wagons to spare during the heavy butter season. The Commissioner for Railways is prepared, however, to experiment with the use of a wagon during the coming season;

- (b) That it is also noted that this matter will receive further consideration by the Transport Committee.

29. *Entomological Work—*

That Messrs. Hives, Quodling, Ranger, and Short be appointed as the representatives of the Council on the Committee (consisting of representatives of the Department of Agriculture, the University of Queensland, and the Council of Agriculture) which it is proposed to form for the purpose of preparing a scheme for the possible correlation of the entomological work so far as these three bodies are concerned.

30. *Draft Bill—Compulsory Pools—*

- (a) That it is noted from a statement made by the President at this meeting that a draft Bill has been prepared;
- (b) That, in accordance with the President's suggestion, it be a recommendation to the Minister for Agriculture to cause each member of the Council to be furnished with a copy of the proposed Bill, on the understanding that the particulars will be regarded by members as confidential; and that an opportunity be afforded to the Council to consider the measure at its next meeting.

31. *Primary Producers' Organisation Bill—*

The Primary Producers' Organisation Bill was considered by the Council, and it was decided to suggest the following amendments:—

- (a) Definition of "Primary Producer" to be amended to read:—Every person engaged in the occupation of and any class of persons not being persons engaged in primary production as employees on wages or piecework rates.

- (b) *Quorum at Council Meetings—*

Clause (4) (7) to be amended, to read as follows:—"Subject to this Act a majority of members of the Council shall constitute a quorum at any meeting of the Council."

THE DIRECTOR, QUEENSLAND PRODUCERS' ASSOCIATION.

MR. R. L. MACGREGOR'S CAREER.

Mr. Richard Lewis Macgregor is a native of Scotland, and is 36 years of age. He was educated at the Glasgow High School and later at the Glasgow and West of Scotland Technical College. His early business training was acquired at an old-established Scottish county house, where he was trained in banking and law. This house managed the agricultural estates of the late Sir Donald Currie, and Mr. Macgregor was attached to that department and had opportunities of becoming familiar with the theory and practice of modern agriculture, including stock and crop marketing.

At the age of 23 Mr. Macgregor accepted the position of assistant manager of the Gaikbhata Estates, Bengal, India. This company controlled several large landed estates, and a large factory. Upwards of 5,000 people were connected directly or indirectly with the company, which undertook housing, water supply, roads, drainage, &c., in addition to works connected with cultivation and manufacturing. While in India Mr. Macgregor had full opportunity afforded him of mastering every detail of business organisation and the control of a large staff. Being desirous of coming to Australia, Mr. Macgregor, after completing his term of engagement with the Bengal company, declined an offer of extended service at increased remuneration, and came to Australia.

Arriving at Perth (Western Australia), he became secretary to Mr. J. Hawter, of Hawter's orchards and nurseries. He there acquired an intimate knowledge of every branch of fruitgrowing, including the growing of young trees—citrus and deciduous—as well as the growing of fruit for the export trade. He relinquished that position to take up wheatgrowing on his own account. At the time he was engaged in wheatgrowing, the agriculturists in the western State were passing through a succession of hard times. The Farmers' Co-operative Company had just been brought into being, and was operating in a very small way under the management of Mr. Stirling Taylor, who is now Director of the Bureau of Commerce and Industry. Mr. Macgregor formulated a scheme for the extension of the co-operative principle in the agricultural districts in the State, and, on outlining the scheme to Mr. Taylor, was invited by the latter to join him in the carrying out of the project. That success attended his organising efforts in this direction will be manifest when it is stated that the co-operative organisation in the western State now embraces the central wholesale house, the Westralian Farmers Limited, and some ninety odd local co-operative companies engaged in various kinds of co-operative undertakings. Starting eight years ago with a capital of £2,000, the Central company alone now has a capital and reserves amounting to approximately £100,000. When the scheme had been launched, Mr. Macgregor was invited by Mr. Taylor to undertake the management of three of the principal departments of the organisation. In the year 1917 the Farmers' Co-operative Company was successful in securing appointment as sole wheat-acquiring agents in the marketing of wheat for the Western Australian Government. Wheat had to be acquired at some 300 sidings, and large quantities had to be stored for long periods, the work entailing a large inside and outside staff. Owing to the magnitude of the undertaking, Mr. Macgregor was placed in control of that department and at the present time is manager of the wheat department. Mr. Macgregor is also the originator of the present scheme for the bulk handling of wheat in Western Australia, and, in addition to being manager of the wheat department of the Westralian Farmers Limited, is secretary to the Western Australian Grain Growers' Co-operative Elevators Ltd., the company which has been floated to carry out the scheme. He is entirely familiar with every aspect of that question.

In the year 1919 he was sent by the Farmers' Co-operative Company as sole representative to Europe to inquire into the marketing of agricultural products. Reports of his investigations were made available to the Commonwealth Government, and in that connection the Director of the Bureau of Commerce and Industry wrote him as follows:—

"I want to compliment you on both the wheat and fruit reports; the knowledge which you have gained will be invaluable to the whole industry, and should, when it becomes known, dissipate much of the doubt the companies have regarding the success of their own selling schemes."

While overseas, Mr. Macgregor took the opportunity of again familiarising himself with the methods and practices of the great English and Scottish Co-operative Wholesale Societies, and furnished reports to his principals dealing with these concerns.

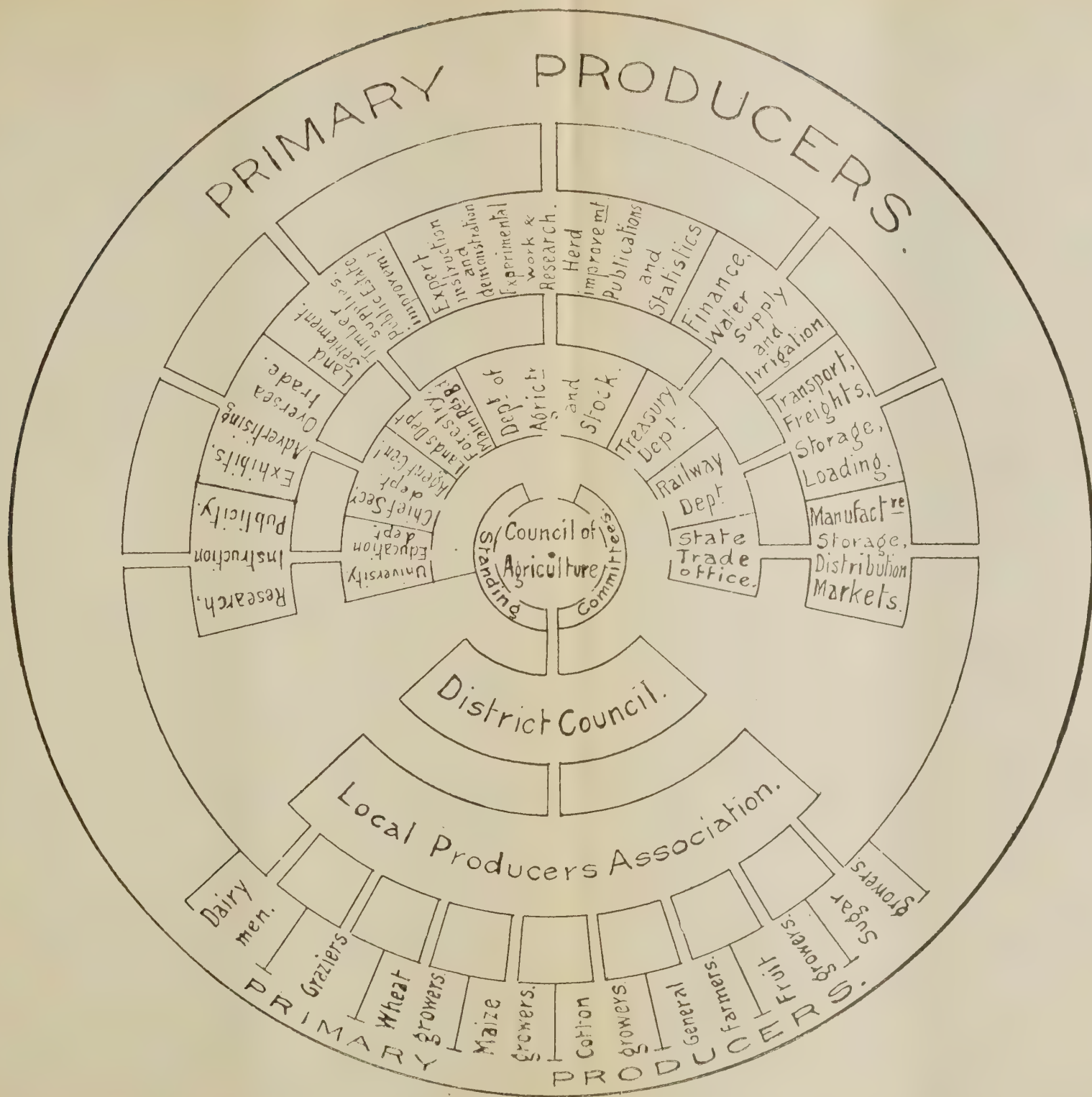
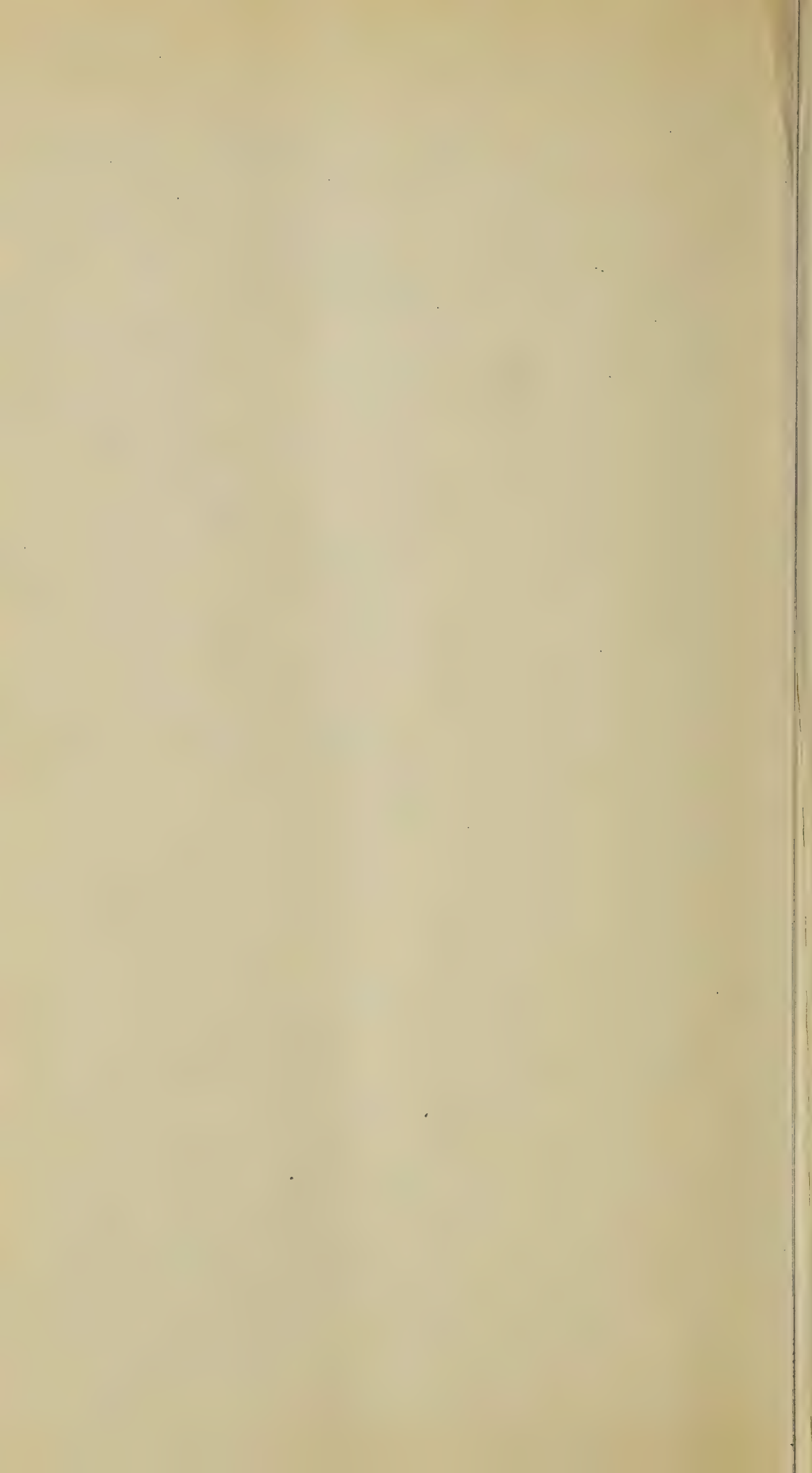


PLATE 8.—DIAGRAM SHOWING THE PROPOSED ORGANISATION OF QUEENSLAND PRODUCERS.



CASSAVA-GROWING AND MANUFACTURE.

In reply to a correspondent, who asks for some information concerning the cultivation of cassava and the method of extracting the farina, we republish notes on the subject which last year formed the subject of an article supplying whatever information we could obtain as to cultivation, and suggesting the use of the same machinery as that used by arrowroot-growers in preparing the arrowroot of commerce.

There are two varieties of the cassava (or, as it is known in Spanish America, manioc), viz., the sweet and the bitter, the latter bearing the botanical name of *M. utilissima*, the former *M. Aipi*. The more important is the bitter cassava, and this is the variety universally grown for the manufacture of tapioca. Its roots grow to a length of 2 feet, and weigh each about 8 lb. The average length is about 1½ feet. This root is yellow, and both root and stems contain a milky, powerfully poisonous juice. This poison, fortunately, is exceedingly volatile, so much so that if the sliced roots are exposed to the sun for a few hours the poison vanishes and the roots may then be safely fed to stock.

The sweet variety is distinguished from the bitter in that the roots are much smaller and of a reddish colour, and contain no poison whatever. They may be used to make tapioca, without any previous preparation. The return is, however, too small to make it worth while to grow this variety. Some years ago a sugar-planter in the North of Queensland planted a few acres of bitter cassava, but allowed it to die out owing to the want of a machine by which it could be treated.

We are informed that cuttings may be obtained by application to the Superintendent of the Yarrabah Mission Station, *viâ* Cairns, Queensland. The cuttings, if available, would be sent sealed at both ends, which will ensure their vitality on arrival at their destination. From the same source it may be that you could obtain information as to the necessary machinery.

It should be noted that the cassava plant thrives best on the coast land. There the roots yield a maximum of starch, whereas if grown further inland in dry areas the roots become more woody and poorer in yield of starch. Scrub land soil is to be preferred. In a damp soil the roots degenerate or rot away.

The machinery for extracting the farina is very similar to that used in the preparation of arrowroot, and is very simple. It can be supplied by any manufacturer of machinery in Queensland or in the other States of the Commonwealth.

A SUMMARY OF EXPERIMENTS CARRIED OUT BY THE BUREAU OF SUGAR EXPERIMENT STATIONS—III.

By H. T. EASTERBY, General Superintendent.

The first article of this series, in the course of which Mr. Easterby discussed deep cultivation experiments and tabulated comparative crop results from subsoiled and non-subsoiled fields, was published in the May "Journal." The second instalment was an account of the results of irrigation experiments and the action of irrigation and manures upon the density and purity of sugar juices, and appeared in the June issue. The third instalment treats of experiments in fertilisation.—Ed.

FERTILISER EXPERIMENTS.

A number of experiments with fertilisers have been carried out at the Sugar Experiment Stations. The first of these was to test the action of fertilisers upon crops cultivated in the ordinary way, and those receiving deep, thorough, and subsoil cultivation. The results of these are summarised hereunder:—

EXPERIMENTS WITH MIXED FERTILISERS.

MIXED MANURES OF NITROGEN, POTASH, PHOSPHORIC ACID.	ORDINARY CULTIVATION.		DEEP, THOROUGH, AND SUB- SOIL CULTIVATION.	
	Cane per acre, English tons.	Sugar per acre, English tons.	Cane per acre, English tons.	Sugar per acre English tons
1. Fertiliser	31.6	4.0	52.1	7.2
2. No fertiliser	28.6	3.8	48.0	6.6
Difference	3.0	0.2	4.1	.06

The results from the application of a mixed fertiliser in these examples are not very great. It is noted that the manure gave a higher increase of return in cane, and

more notably in sugar, upon the "deep cultivation" land than where "ordinary cultivation" was practised. During the first nine months of the life of the cane in these experiments the weather was extremely dry and rainless. The cane under ordinary cultivation ceased growing several months before the deeply cultivated cane did, which may account for the smaller use it made of the manure. Had rain been abundant, the fertiliser, with ordinary cultivation, would probably have given the highest results.

FERTILISER EXPERIMENTS WITH SINGLE ELEMENTS.

These experiments were carried out in order to try to determine the fertilising action of each of the individual chemical elements. The experiments were made in two series or in duplicate, and upon the "irrigated" and "non-irrigated" areas of cane. To economise space, the number of trials in each series are run together, and results given in average.

The results represent the actions respectively of nitrogen, potash, lime, and phosphoric acid, in comparison with results where no fertiliser was used:—

ACTION OF THE ELEMENTS ON NON-IRRIGATED CANE.

Fertilising Elements.						Weight of Cane per acre, in English tons.	Total Sugar per acre, in English tons.
1. Nitrogen	..	..	..	..	..	51.5	7.0
2. Potash	..	..	..	..	..	51.5	6.9
3. Lime	..	..	..	..	..	50.5	6.5
4. Phosphoric acid	..	..	..	..	..	48.9	6.7
5. No fertiliser	..	..	..	..	..	48.3	6.6

ACTION OF THE ELEMENTS ON IRRIGATED CANE.

Fertilising Elements.						Weight of Cane per acre, in English tons.	Total Sugar per acre, in English tons.
1. Nitrogen	..	..	..	..	..	48.9	6.7
2. Potash	..	..	..	..	..	49.5	6.7
3. Lime	..	..	..	..	..	46.7	6.1
4. Phosphoric acid	..	..	..	..	..	43.2	5.8
5. No fertiliser	..	..	..	..	..	40.5	5.9

The respective actions of the several elements are set forth in the above table. It is, in the first place, observed that the fertilising action throughout was notably greater in the series where irrigation water was applied than where the crop was grown by rainfall only. This result appears to confirm the observation made in connection with the "mixed fertiliser" results—viz., that, "had rain been abundant the fertiliser, apart from cultivation, would have given greater results." Nitrogen and potash not only give the highest results; they give practically identical returns in each of the two series—with and without irrigation. These results are strictly in agreement with the findings of the laboratory, the soil analyses having indicated that nitrogen and potash were the elements more emphatically in request.

The above experiments were made with plant crops only.

EXPERIMENTS WITH PLANT AND RATOON CROPS, 1906 TO 1909.

In the following tables are shown results from the use of mixed fertilisers in plant, first, second, and third ratoons upon irrigated and non-irrigated cane:—

Plots.	1906 PLANT CROP.			1907 1ST RATOON CROP.			1908 2ND RATOON CROP.			1909 3RD RATOON CROP.		
	Man- ures.	No Man- ures.	Differ- ence.	Man- ures.	No Man- ures.	Differ- ence.	Man- ures.	No Man- ures.	Differ- ence.	Man- ures.	No Man- ures.	Differ- ence.
Irrigated ..	58.4	54.1	4.3	41.9	32.6	9.3	39.5	24.0	15.5	35.1	19.6	15.5
Non-Irrigated ..	50.7	47.4	3.3	42.4	31.7	10.7	38.8	24.1	14.7	35.9	19.8	16.1

These mixed manures were composed of 150 lb. nitrate of soda, 150 lb. sulphate of ammonia, 100 lb. sulphate of potash, and 300 lb. of superphosphate, per acre.

The increase in the plant crop, when the land had been freshly subsoiled and had been limed and green manured, was only small. The action of the deep ploughing combined with the lime would cause a large amount of the chemical plant food elements to be brought into a soluble and available condition for the use of the crop. The difference, therefore, between manured and unmanured cane in the plant crop was not very striking. When we come to the ratoon crops the results of manure are at once apparent, and the yields for manure are highly satisfactory.

EXPERIMENTS WITH MIXED MANURES AND SINGLE ELEMENTS.

The following experiments were carried out from 1911 to 1913, and the results are summarised below:—

CROP RESULTS TO DATE: MANURIAL EXPERIMENTS—PLANT, FIRST RATOON, AND SECOND RATOON CROPS,
1911, 1912, AND 1913.

Variety of Cane.	Manure Applied.	No. of Plot.	PLANT CROP, 1911.		FIRST RATOON CROP, 1912.		SECOND RATOON CROP, 1913.		TOTAL YIELD OF THREE CROPS.	
			Yield of Cane per Acre, in English tons.	Yield of Sugar per Acre, in English tons.	Yield of Cane per Acre, in English tons.	Yield of Sugar per Acre, in English tons.	Yield of Cane per Acre, in English tons.	Yield of Sugar per Acre, in English tons.	Yield of Cane per Acre, in English tons.	Yield of Sugar per Acre, in English tons.
New Guinea 40..	Nitrate of soda ..	1	49.1	7.4	26.2	3.4	26.9	3.7	102.2	14.5
New Guinea 40..	Sulphate of ammonia	2	48.0	7.1	28.7	3.4	30.5	4.3	107.2	14.8
New Guinea 40..	Sulphate of potash..	3	47.4	6.8	24.9	3.4	24.2	3.4	96.5	13.6
New Guinea 40..	Mixed fertiliser ..	4	47.4	7.3	30.7	3.9	30.1	4.4	108.2	15.6
New Guinea 40..	No manure ..	5	42.0	6.5	18.6	2.7	18.1	2.8	78.8	12.0

The quantities applied per acre were as under—

Nitrate of soda	..	..	..	..	4 cwt.
Sulphate of ammonia	..	..	..	..	4 cwt.
Sulphate of potash	..	..	..	..	4 cwt.
Mixed fertiliser	..	..	..	..	4 cwt.

The mixed manure consisted of 172 lb. sulphate of ammonia, 69 lb. sulphate of potash, and 207 lb. of superphosphate. This was a very small dressing of mixed manure, but it gave the best result over the three crops.

The profit per acre for the mixed manure was considerably greater than for any other fertiliser used.

It has always been maintained that more payable results can be secured from the use of fertilisers containing the three elements—viz., nitrogen, potash, and phosphoric acid.

FERTILISER EXPERIMENTS WITH FIRST RATOONS OF D. 1135. AGE OF CANE,
13 MONTHS—BUNDABERG SUGAR EXPERIMENT STATION, 1914.

Plot No.	Manure applied.	Tons of Cane per Acre.	Tons of Total Sugar per Acre.	Tons of Pure Obtainable Cane Sugar per Acre.
1	Nitrate of soda, 4 cwt.	23·17	3·14	2·84
2	Sulphate of ammonia, 4 cwt.	24·56	3·45	3·16
3	Sulphate of potash, 4 cwt.	20·03	..	..
4	Meatworks, 6 cwt.	20·95	2·96	2·68
5	Mixed manure, 6 cwt. (nitrogen, potash, and phosphoric acid)	26·17	3·71	3·43
6	No manure	19·13	2·78	2·57

The above was one of the first experiments carried out with fertilisers on the Bundaberg Experiment Station, and was on a large scale. The fertilisers were applied to ratoons existing upon the station at the time of purchase. Due to the fact that the station was not taken over till the end of December, 1913, the fertilisers could not be applied till late in that month. This was followed by a comparatively dry period, and it was not till the following March that any real growing weather set in.

This had an adverse effect upon the manures generally, although the result of the mixed manures was, on the whole, satisfactory and in line with experience elsewhere.

Analyses of these canes were carried out by the nearest mill; but, due to an oversight, the cane from the sulphate of potash plot was not analysed, so that the sugar per acre cannot be given.

The following year mixed manure was applied to part of the second ratoons of the above crop, a part receiving no manure. The results were as follow:—

Treatment.	Yield of Cane per Acre, in English tons.	Yield of Commercial Cane Sugar per Acre, in English tons.
Mixed manure	29.75	3.82
No manure	22.17	2.94

Difference for manure—7.58 tons cane per acre.

At the Experiment Station, Bundaberg, excellent results were secured from the action of mixed fertilisers upon a first ratoon crop of standover D1135 in the year 1917, which was a very favourable season.

CROP RESULTS FROM EXPERIMENTS WITH AND WITHOUT MANURES—STANDOVER FIRST RATOON, D. 1135, 1917.

Plot No.	Treatment.	Age of Cane.	Weight per Acre, in English tons.	Yield of Commercial Cane Sugar per Acre, in English tons.
1	Mixed manure, consisting of sulphate of ammonia 1 cwt., nitrate of soda 1 cwt., sulphate of potash 1 cwt., and meat-works manure 1 cwt.	25 months	80.75	12.04
2	No manure	25 months	60.54	9.66

The difference made in the yield in the above experiment was 20.21 tons of cane and 2.38 tons of sugar per acre for the use of mixed manure. The total yield was very high, and goes to show how profitable standover crops of cane in the Bundaberg district can be when seasons such as 1917 are experienced.

Still better results were secured in the following year from the use of mixed fertilisers in the same proportions on the second ratoon crop.

CROP RESULTS FROM EXPERIMENTS WITH AND WITHOUT MANURES—D. 1135, SECOND RATOONS, 1918.

Plot No.	Treatment.	Age of Cane.	Weight of Cane per acre, in English tons.	Yield of Commercial Cane per acre, in English tons.
1	Mixed manure, consisting of sulphate of ammonia 1 cwt., nitrate of soda 1 cwt., sulphate of potash 1 cwt., and meat-works manure 1 cwt.	12 months	37.29	4.93
2	No manure	12 months	14.62	1.82

This shows a difference of 22.67 tons in favour of the manure.

The above experiment with fertilisers covered four crops—i.e., plant, first, second, and third ratoons. A summary of the results are included below.

CROP RESULTS TO DATE OF EXPERIMENTS WITH AND WITHOUT MIXED MANURES.

Plot No.	Variety of Cane.	Treatment.	PLANT CROP, 1915.			FIRST RATOON CROP, 1917 (STANDOVER).		SECOND RATOON CROP, 1918.		THIRD RATOON CROP, 1919.		AVERAGE OF FOUR CROPS.	
			Yield of Cane per Acre, in English tons.	Yield of c.c.s. per Acre, in English tons.	Yield of c.c.s. per Acre, in English tons.	Yield of Cane per Acre, in English tons.	Yield of c.c.s. per Acre, in English tons.	Yield of Cane per Acre, in English tons.	Yield of c.c.s. per Acre, in English tons.	Yield of Cane per Acre, in English tons.	Yield of c.c.s. per Acre, in English tons.	Yield of Cane per Acre, in English tons.	Yield of c.c.s. per Acre, in English tons.
1	D. 1135..	Mixed manure, consisting of sulphate of ammonia 1 cwt., nitrate of soda 1 cwt., meatworks manure 1 cwt., sulphate of potash 1 cwt. Sub-soiling	21.90	3.37	30.75	12.04	37.29	4.93	16.13	2.40	39.02	5.68	
2	D. 1135..	No manure	20.04	3.03	60.54	9.66	14.62	1.82	12.60	1.90	26.95	4.00	

It will be seen from the above table that there was a net average increase of 12.07 tons of cane for the use of the mixed fertiliser, which paid exceedingly well.

(TO BE CONTINUED.)

SUGAR : FIELD REPORTS.

The Northern Field Assistant attached to the Bureau of Sugar Experiment Stations, Mr. E. H. Osborn, reports under date 6th July, 1922:—

“Herbert River.—A short visit was made to this district early in June. The weather conditions were then very dry, with fairly cold nights; in fact, a touch of frost was felt in the Stone River district one morning. The rainfall so far this year has been very unevenly distributed, as out of a total fall of 56.44 inches for Ingham and 62.01 for Halifax, nearly 70 per cent. fell in February and very small amounts since, and in consequence the cane generally has not made the growth that it should, and is “yellowing” in places. At the time of my visit a few good showers would have been of great benefit to the early planted cane (which, so far, looked very well), and also to help any cane along that showed signs of grubs. Although the latter are to be seen in isolated places, they do not seem to be any worse than last season.

“Borers were noticed in several places, and the absolute necessity for using only healthy cane when planting out cannot be impressed too strongly upon growers. It is gratifying to know that the C.S.R. Company at Macknade are now breeding Tachinid flies for liberation in borer-infested areas. Next year’s crop has probably been planted in the following order:—H.Q. 426, Badila, and H.Q. 409. The company are also distributing to growers plants from New Guinea varieties known as Corambo, Nanemo, and Korpi. Canes from the South Johnstone Station are also being extensively tried out, those most in favour being Tableland, Badila, E.K. 1, E.K. 28, and Q. 813. The last-named was noticed as having given excellent striking results in the company’s experimental plot at Macknade.

“Macknade started crushing on the 2nd instant, whilst Victoria hoped to commence about the 7th, and unless the weather keeps very dry or the grubs do much more damage than expected, the Herbert River district should certainly harvest a larger tonnage of cane than was put through in 1921. Plenty of labour was available for all work, and the company look forward to a fairly satisfactory season.

“Cairns District.—This district was reached on the 6th of June, and practically the same dry conditions as were prevailing on the Herbert were noticed here, except that although the Cairns rainfall was only 55.06 inches for the same period, it was better distributed than the Herbert River fall. Rain was, however, very badly needed, both for the very large area of young plant cane and also to keep the grubby cane going.

“Unfortunately, grubs have appeared over a wider and more scattered area than formerly. Several farmers generally affected have not suffered as much as in former years, whilst areas formerly free are now suffering to some extent.

“It is noticeable how much better D. 1135 stands up to grubs than either Badila or H.Q. 426, and in consequence the proportion of the former cane is on the increase. At Freshwater no signs of grubs, or, indeed, of any pest are to be seen, and the cane areas there present a healthy appearance, and some very fine cane is met with. The tram lines connecting the farm with Redlynch are now very nearly completed, and I understand that the cane haulage on the latter will be done by means of a couple of motor engines.

“With the present outlook it seems that probably 55,000 to 60,000 tons of cane will be railed to Hambledon from this centre. Great progress is being made in this particular part of the Cairns district. New homes are to be seen in every direction, and when the season starts, the Freshwater district will be a very busy place.

“Mulgrave District.—The Mulgrave Mill now presents a very busy scene. The extensive alterations are nearing completion, and the manager expects to handle a large crop. The old mill can hardly be recognised in the splendid plant that has taken its place.

“Planting has been carried out on a large scale this year, and a further acreage of land is still being prepared. Quite a large proportion of the recently planted cane is D. 1135. At Highleigh, Mr. Jno. Cannon has some very fine cane of this variety. He finished planting in October, and the cane when seen looked good enough for a 25-ton crop. Previous to planting, Mr. Cannon had used a couple of tons of burnt lime to the acre on this block, and, after planting, about 4 cwt. of mixed manure. At present Mr. Cannon is using two tractors on his large farm, and speaks most highly of the good work they are doing.

“Babinda.—The Babinda area in general is so porous that constant rain is needed to enable the cane to do its best. The dry spell ended just after the mill started crushing on the 15th, and 3.22 inches were registered between then and the 19th. The general appearance of the crops was rather backward, the ratoon in

particular being very poor. Owing to such a very heavy wet season last year, very little early planting was carried out, and the late-planted cane has still a long way to go. The recent dry spell had its advantages, however, as a large area of land was planted, some of which had struck very well. Although Badila is the principal cane grown here, with a proportion of D. 1135 and H.Q. 426, very many inquiries are being made as to the newer varieties, and a large number of growers have applied for plants from the Experimental Station at South Johnstone. E.K. 1, E.K. 28, Q. 903, and Tableland Badila seemed most in favour.

"A new tractor was also noticed on Mr. Treickel's farm on Babinda Creek, the owner remarking what good work he was now able to do. Grubs are certainly more scattered than in former years, but they have not done much damage this season.

"Borers are in evidence in a few places, but apparently not as much as formerly. Generally speaking, the district is a very prosperous and growing one, especially when one remembers that the sole school accommodation in 1914 was a small temporary building in the mill yard, whilst now the large school at Babinda is supplemented with schools at Mirriwinni and Bartle Frere, whilst a further school at Bellenden Ker is now practically ready to open. Surely this is a good argument for the continuation of the present sugar agreement and its bearing on the White Australia ideal.

"*Mossman*.—When this area was visited during the third week of June, the conditions of the crops, as a whole, were very good; and, as far as one could judge, the cane generally was more forward in growth than in any other sugar areas visited during the month. Very little damage has so far been caused by grubs, nor was the presence of the borer noted. Prior to my visit, some three weeks of dry weather had been experienced, but several light showers, resulting in the registration of 58 points for the week ending 27th instant, relieved the situation, and as the area of young cane was very considerable and the weather still warm, this fall was very beneficial.

"A certain amount of green manuring is being carried out, but very little lime has so far been used. The soil in most cases gives an acid reaction, and bulk samples sent to the Sugar Bureau for complete analysis emphasise the need of lime. So far, no satisfactory arrangements have been made to work the limestone deposit at the 7-Mile. Last year the mill crushed 62,000 tons of cane; and, with a slight increase in acreage for this season, it is more than likely that 70,000 tons will be the result of the 1922 crushing.

"As mentioned in previous reports, D. 1135, H.Q. 426, Badila, 24B (green Goru); B. 147, M.Q. 1, and 1900 Seedling are the principal canes grown in this area.

"Some good crops of D. 1135 were noticed in several places. At one farm a crop of sixth ratoons will again cut a 15-ton crop. The mill expects to start operations about the middle of July, and as it has had a thorough overhauling, and also had considerable additions to its plant, its work during the coming season should be most efficient. Plenty of good labour is available, and the management look forward to a successful season."

The General Superintendent of the Bureau of Sugar Experiment Stations has received the following report, dated 7th June, 1922, from the southern field assistant, Mr. J. C. Murray:—

"During June, 1922, the Mackay district was visited. This includes the sub-areas of Farleigh, Homebush, Sarina, Pinnacle, and Owens Creek, and areas in the environs of Mackay township.

"Taking the areas immediately around the city, it is noticeable that the cane has suffered greatly since last February from lack of rain. The different varieties are backward and parched-looking, although healthy, while the young plant cane has struck well, but the leaves present that whitish chlorotic appearance indicative of lack of sufficient nourishment. In many cases the growers, regarding the present standing crop, have not been persistent enough in their cultivation subsequent to planting, and the result is a very hard interspace, with a heavy growth of weeds.

"Regarding cane varieties that are making a good showing in this area, there are Q.970, D.1135, Q.458, Q.813, Malagache, H.Q.285, Q.1121, Q.855, N.G., 24B. Clark's Seedling and Badila also look well on many farms. No serious indications of disease were noticeable, nor was much apparent damage being caused in this locality by insect or fungoid parasites. A number of canes were arrowing or showing inclination thereto. The varieties appearing to arrow more freely than others were Uba and M.1900 Seedling.

"*Farleigh*.—On this area the soil is different to the pioneer flats, and, while inferior in some respects, appears to have better moisture-conversing properties.

Many cultivated areas around Farleigh are still moist, and excepting for the soil temperature, are quite fit for planting. The farmers here also cannot attach too much importance to the value of cultivation as long as it is possible to work in the cane. If a man has a larger area than he can conveniently work, it is better to relinquish some of it for a small farm well cultivated.

"Cane grubs are causing minor losses on the Farleigh farms, although no grower complained of serious loss. The destruction of feed trees—the fig, &c.—is to be recommended as incidental to checking infestation by these pests.

"Cane varieties making a satisfactory showing here are H.Q.426 (Clark's Seedling), Q.813, Badila, Q.1121, M.1900 Sport, and D.1135.

"Several watercourses are running strongly in the Farleigh district, and farmers on the banks of them could irrigate in the majority of cases without heavy expense.

"Owing to the long spell of dry weather, fertilising has generally been considered unprofitable for the recently planted cane. Therefore the percentage of farmers using concentrated manures has been small. Mixed and meatworks fertilisers have been used, but as far as can be observed the results so far are negative. Pulverised limestone has also been tried.

"As mentioned many times previously, green manuring is an important phase of sugar-cane agriculture, and is to be highly recommended wherever the land appears to want texture.

"*Sarina*.—The cane on Plane Creek is probably greener than on any other area in the Mackay district, but the cane itself, in common with other places, is short. However, if good rain fell now, such varieties as 1900 Seedling, which matures about October, would make great growth and probably pull the crushing up considerably.

"Many of the farmers are hard at work planting. That cane which has been planted during the autumn looks well.

"The cane-grub is causing serious loss in places. Continuous and deep cultivation will do much to check the grub attack on the cane roots, as well as ploughing in as much trash and vegetable matter as possible. Composts should be made of the trash with animal manure when possible, and then worked into the soil. Burning of cane should be consistently discouraged, and growers are recommended to plant cane varieties that do not require burning.

"Varieties doing well on the Sarina areas are H.146, Q.1121, H.Q.285, D.1457, Q.813, 1900 Seedling, D.1135, Hybrid No. 1, Q.458, N.G.15, "Pompey," Black Innis, Cheribon, and Clark's Seedling. None of these canes, however, are showing any particular resistance to grub attack, although Badila and D.1135 on an average are not showing signs of marked deterioration. Pompey is proving to be a good cane, with splendid ratooning qualities.

"Practically all the varieties mentioned are showing inclination to arrow.

"In common with other places, the growers have not gone in for much chemical fertilising, being content to wait until rain comes and the likelihood of a more positive result in this respect.

"*Marian*.—This portion of the Pioneer River sugar country is badly in need of rain, and the growers will have to considerably reduce their original estimate. The soil here is porous and well drained, and while it quickly responds to good weather conditions, gets very bad in drought. However, if rain fell at once, the cane would still increase in weight. The growers here are progressive, and probably do as much good farming as any other district in Queensland, and good results have been obtained in the past by cowpea manuring and the use of lime.

"Fertilisers used and giving positive results in normal seasons are sulphate of ammonia and meatworks manures. The soil is a light forest loam with an average acid reaction.

"Varieties showing the best growth at present are Clark's Seedling, 1900 Seedling, Malagache, and D.1135. Badila is a cane that is making a good response on some farms.

"*Pinnacle Plains and Owens Creek*.—These areas are probably the richest agricultural belts in the Mackay district. At present the cane is suffering from want of rain, and loss is being occasioned by grub-infestation in parts, but these factors are not likely to be a permanent drawback to the producing power of these farm lands.

"The railway has almost been completed up Owens Creek, and a considerable area of land hitherto unploughed is being broken up for planting, while there are still large areas suitable for sugar-growing awaiting the settler. The land adjoining Owens Creek is for the most part a deep-made soil, consisting of alluvial and granitic deposits with plenty of vegetable matter deposited from periodical overflows from the

creek. Varieties doing well here at present are M.1900, Badila, Green Gornu, Q.813, H.Q.426, Cheribon, Q.458, and D.1135. Of these, M.1900 Seedling and Badila appear to be the best.

"The average reaction of the soil in these parts is acid, and the growers are recommended to obtain supplies of burnt lime and apply 25 cwt. per acre.

"Probably the only other matter necessary to successfully raising cane here is intensive cultivation. It is improbable that artificial manures will be required for some time, excepting, perhaps, on the forest land lying back from the creek. This would be benefited also by crops of green manure.

"The cane right up Cattle Creek to the mill looks dry but healthy, excepting where grubs have made an occasional attack. If rain fell at once there would still be a big tonnage added in the next few months.

"*Homebush*.—The farmers here are busy planting at present, and the management has just completed its plant for transshipping the coming crop to Farleigh. This has involved a considerable amount of labour and money, but the work under Mr. Axam, the Homebush manager, has been carried out with efficiency and despatch.

"As with other districts, Homebush shows the want of rain. Most of the cane is very healthy, however, and there are no complaints by the farmers of any disease of a serious nature or grub infestation.

"The most popular variety growing at present is Malagache. Other varieties being raised successfully are Pompey, Q.1098, M.1900, D.1135, H.Q.426, and Q.813. Pompey is proving to be a good cane, and numbers of farmers are now raising this variety. Q.813 is a variety that is doing well and which the growers should endeavour to get more of.

"The soil here has an average acid reaction, and requires lime more than anything else.

"The farmers should note that it is a bad plan to use a plough in plant cane after it has begun to root."

THE SUGAR-GROWING DISTRICTS OF NORTH QUEENSLAND.

By H. T. EASTERBY, General Superintendent of Sugar Experiment Stations.

The General Superintendent of the Bureau of Sugar Experiment Stations, who has been absent from Brisbane during the past seven weeks (1st July, 1922), states that during that time he visited the sugar districts of Bundaberg, Mackay, Lower Burdekin, Mossman, Cairns, Babinda, and Innisfail.

At Bundaberg it was found that the prolonged dry weather had adversely affected the yield, and the large crop it was anticipated would be harvested has now shrunk a good deal. The standover cane has suffered considerably, and although last year's plantings received an excellent start, the lack of rain during the past three or four months has prevented the cane making the growth it should have done. A large quantity of cane is presenting a withered, and in some cases a dying, appearance. This is exceedingly disappointing, as some few months ago everything pointed to a bumper crop in this and the Isis district, which has also in common with all the southern districts suffered greatly from the prolonged dry spell. A fair amount of planting for next season has been done.

The climatic conditions at Mackay, while not quite so severe as at Bundaberg, have also held the crop back, and the mills have all been obliged to reduce their estimates and postpone their crushings till a later date. It is most unfortunate that the usual wet season this year did not put in an appearance, as the rainfall previous to the end of last year was good and sent the cane crops well ahead. A good deal of new land is being opened up about Mackay. In addition to the fine cane areas at Carmilla, about 1,000 acres of first-class forest and scrub land have been sold at the Pinnacle, on the Hatton line; also new areas near to Carmilla, on the Mackay-Rockhampton line, are being opened up for canegrowing.

Exceedingly dry weather has also been experienced on the Lower Burdekin district, and many areas not irrigated were found to be dying or dead. The irrigated cane, however, looked well-grown, green, and healthy. The cane on the State farm, Home Hill, had made excellent growth, and should cut out well. The Tableland Badila was conspicuous by its fine appearance. The mills on the lower Burdekin, while not realising earlier anticipations, will have a fair crushing. Grubs were found to be doing some damage in places, and as this district has never been affected to any extent, this is giving rise to a good deal of anxiety. Fortunately, so far, they

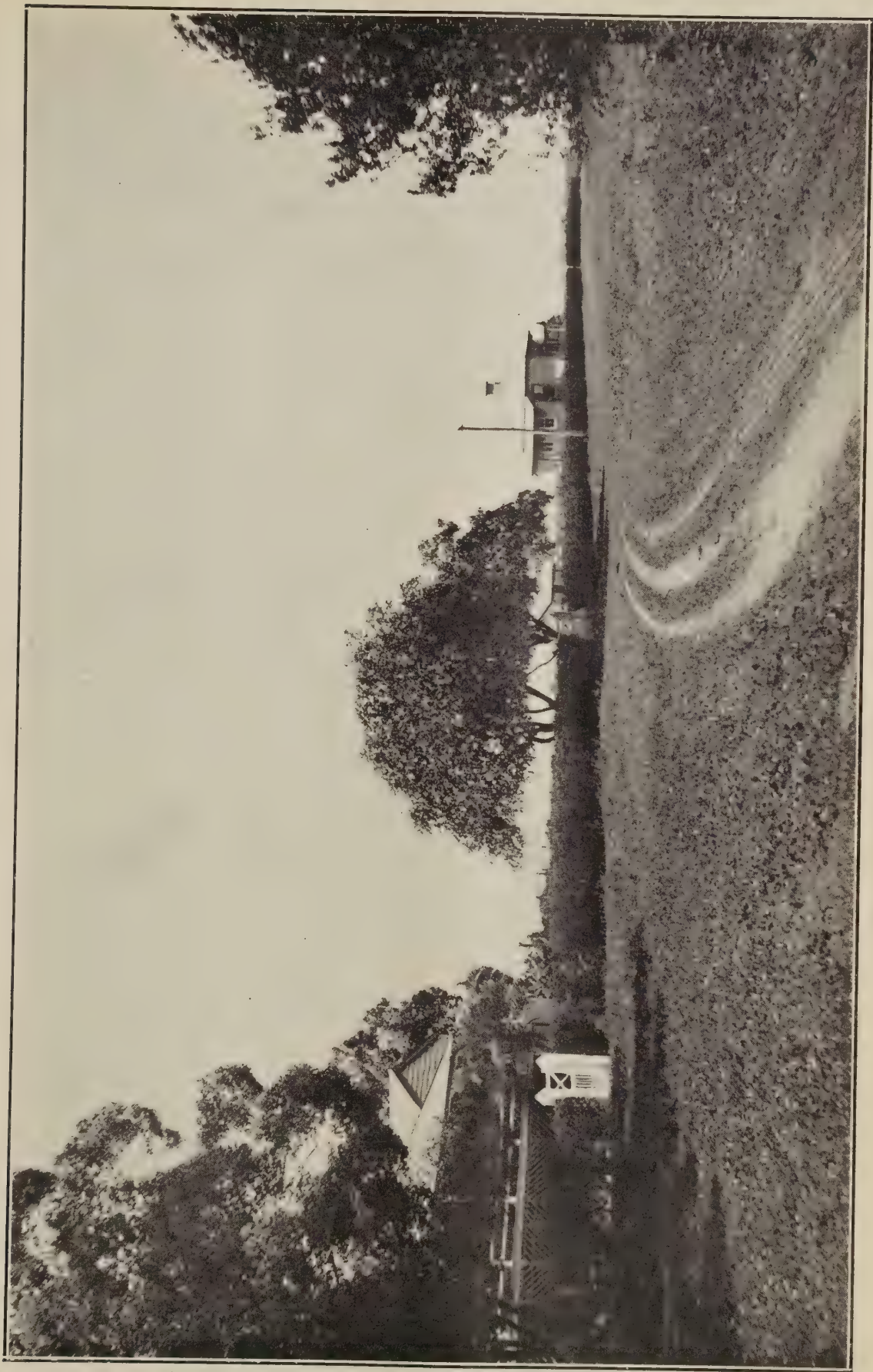


PLATE 9.—SUGAR EXPERIMENT STATION, MACKAY, N.Q.

are confined to the one area. The formation of a Beetle Board and fumigation of the soil by means of carbon bisulphide were recommended.

The Homé Hill irrigation scheme is now well advanced, and water is being supplied to some farmers. It is hoped that in a very short time all the farmers in the scheme will be enabled to irrigate their cane.

The Goru and Badila varieties are still holding their own in the Lower Burdekin district. A very fine crop of "Ginger" was inspected upon the farm of Mr. Crofton, at Ayr. This is a cross between Mauritius Gingham and Striped Goru, raised by this gentleman, and it is doing exceptionally well, and is a good density cane. This cane is also doing remarkably well at the experiment station at Mackay.

The cane crop was found to be good at the Mossman district, where it is expected that about 70,000 tons of cane will be crushed. There is very little grub pest visible, and the cultivation and manuring have been good. Large quantities of fertilisers are purchased by the Mossman Mill for the use of farmers, and these are showing good results.

At Cairns good crops were also seen, but a good deal of this cane in the vicinity of Cairns, Hambledon, and Mulgrave was badly affected by grubs. It is very questionable whether it was a wise thing to abandon the collection of grubs and beetles, as was done some time ago. The matter is now under reconsideration, and it is probable that the collection, as a check measure, will again be proceeded with. The present appearance of the estate at Greenhills, near Cairns, is deplorable, and the acres of dead and abandoned cane and trash must afford a breeding place for the grub. Experiments with arsenic and carbon bisulphide have been carried out here on limited areas with a good deal of success where large applications have been used. The principal feature in the Cairns district has been the enlargement of the two mills of Mulgrave and Hambledon, this being equal to another large mill in the district, and has enabled the fine Freshwater district to go ahead. This beautiful area is now covered with magnificent crops of the Badila variety, and presents a beautiful and attractive appearance. A fine powerful crushing plant has been installed at Mulgrave to take the place of the old mills. The new plant consists of three new crushing mills 72 by 35, with three 26 by 48 cylinder engines, all made by the Maryborough Foundry. In addition there are new juice-heaters and a new set of quadruple effects, bringing the heating surface up to 18,000 feet. The first and second mills have been set with 60-foot centres, while between the second and third mills there are 45 feet, thus providing for plenty of maceration. There are also four high-pressure 120-lb. multitubular boilers, in addition to four 70-lb. boilers to be used for the evaporating plant. The capacity of the mill will be 45 tons per hour, the speed of the carrier 3.2 feet per minute, the maximum roller speed being 16 feet per minute. The maceration water will be passed through a juice-heater so as to be very hot upon application. New centrifugals have also been installed. All the machinery, except the crushing plant, will be electrically driven. All this means that the Mulgrave is practically a new mill of at least 150,000 tons capacity, and it is little short of marvellous that the old machinery has been taken out and this new magnificent plant installed between the end of last crushing and the beginning of the present one. The new machinery was built by the Maryborough and Bundaberg foundries, and everything was supplied in first-class condition and to time. The directors are to be highly congratulated, as well as the manager (Mr. Howe) and the engineer (Mr. Smith), who have worked continuously on the job, aided by their staff, and the whole of the installation work reflects the greatest credit on them. Outside the mill 9½ miles of new tramline have been built of 40-lb. rails on the south side of the Mulgrave to open up the Alomba lands, the cane from which now goes to Mulgrave.

Great improvements have also taken place at the Colonial Sugar Refinery Company's mill at Hambledon, which will also be now capable of dealing with 150,000 tons. A new mill has been installed, bringing the total to four, and much other machinery. The new area of Freshwater has been added to this mill, and the management expect to draw 50,000 tons of cane from that area this year. The enlargement of these two mills is an excellent thing for Cairns, and has meant the opening up of new tracts of fertile cane lands.

The Babinda areas are presenting a good appearance, though some of the late-cut ratoons are backward again this year. The grub pest is not much in evidence in the southern parts of the cane areas. The mill made a fine start on the 14th May, the cane being then of excellent sugar-content. Dry weather had been experienced for about four weeks prior to this, which had greatly assisted farmers. The total rainfall from 1st January to 31st May this year had been 144 inches, as against 186 inches for the same period last year. The mill has received a first-rate overhaul this season, and is confidently expected by the management to do the best of work.

There are very few foreign farmers at Babinda, the total only amounting to 7 per cent. There are, however, a large number of non-British cutters operating this season.

The Innisfail district is not greatly affected by grubs this year. There are practically none about Goondi, but they are more prevalent at South Johnstone. The cane generally is looking well, and farmers are looking forward to a good harvest. For the first five months of the year some 80 inches of rain fell. A dry spell of about four weeks took place from the middle of May to the middle of June, when rain again commenced. It is hoped, however, that the remainder of the season will be comparatively dry, so as to ripen up the cane and assist farmers to get their crops off and in their cultivation.

The annual field days at Bundaberg and Mackay were held during Mr. Easterby's tour, and were eminently successful. Record attendances of farmers were secured, and these displayed an absorbing interest in the station work with cultivation and varieties. Both stations looked particularly well, and great credit is due to the officers in charge (Messrs. Pringle and Keogh).

The experiment station at South Johnstone was presenting a fine appearance, and good crops are anticipated. About 200 seedlings were raised last year, and these are now planted out in the field and making excellent progress. The officer in charge (Mr. McWalters) has carried out his duties in a most satisfactory manner.

Addresses were delivered in nine centres, at which the schemes for the establishment of district councils and producers' associations in connection with the Council of Agriculture were brought under the attention of farmers and discussed. The proposals were well received.

The plantings for next year have so far been good in most districts.

To sum up, it may be said that the crops above Townsville will be very good, while south of that they will be well under the average. It is expected, however, that the crop will reach the amount required by the consumers of Australia. A revised estimate will be issued by the Bureau in a few days.

CANE PEST COMBAT AND CONTROL.

The General Superintendent of the Bureau of Sugar Experiment Stations has received the following report from the Entomologist at Meringa, near Cairns, Mr. E. H. Jarvis, dated 11th July, 1922:—

“GRUB-FUMIGATION AT GREENHILLS.

“The experiments with carbon bisulphide carried out by the C.S.R. Company at Greenhills last February have yielded data which should prove serviceable when dealing with the beetle pest next season.

“The cane on Block J6, which was fumigated towards the end of February, after showing evidence of grub attack, appeared at first likely to recover (see March report), but did not ultimately regain sufficient hold of the ground to withstand subsequent dry conditions experienced from 17th March to 15th April, which, being accompanied by strong winds during the latter month, caused the cane in both treated and control plots to fall over. This experiment shows us the advisability of fumigating early in the season, at a time when grubs are not large enough to materially injure the main roots, and the soil is usually in drier and better condition for such treatment than is the case later on during the wet season.

“A capital instance of benefit to be derived from early treatment may be seen at Greenhills just now (20th June), on Block J6, where the manager, Mr. Hoelscher, fumigated a quarter-acre plot before the cane had become affected by grubs.

“This plot of Badilla received half an ounce of carbon bisulphide to each stool (quarter ounce on each side), while the adjoining plot was not fumigated. Although the cultivation, manuring, and character of soil was the same in both cases, the cane on check plot is noticeably shorter than that on the treated area, this being due to the presence of grubs, which by constantly severing the main surface feeding-roots have materially checked growth of the stools.

“As reported last April, it is possible to successfully fumigate, not only the grubs, but both pupæ and eggs of our grey-back cane-beetle.

“A newly-hatched grub, however, breathes by means of spiracles, of which there are nine on each side of its body, opening directly into trachæ that subdivide again into small and still smaller air-tubes. During this life-cycle stage it is, of course, very susceptible to fumigation, even while in its first instar, and too small to do serious damage to cane roots.

"Then, again, the spiracles of the pupa or chrysalis, which are even larger than those of the grub, afford ready admittance to gaseous fumes.

"In normal seasons bisulphide fumigation should be commenced about the middle of January; not, however, until termination of the egg-laying period, when the ground is usually in good condition for such treatment. Later on, after the rainy season has set in, excessive moisture interferes with the soil porosity, and moreover, grubs being then in the third stage, have started to seriously injure the root system.

D. 1135 AT HIGHLEIGH.

"Learning from Mr. Wilson Irvine that D. 1135 was doing well in the above locality, and, as a result of careful cultivation, had shown a marked tendency to produce abnormally stout canes, a visit was made to Highleigh on the 13th instant, when Mr. J. Cannon drew my attention to certain stools of this variety, planted by him during August and September, which were bearing exceptionally fine canes.

"The block planted in August was manured, but had no lime, while the September planting was treated with 35 cwt. of lime per acre.

"Seeing that D.1135 appears to thrive well in the Cairns district, and is more resistant than Badila to root-eating grubs and to the weevil-borer, growers should not fail to embrace any chance of obtaining an improved strain of this variety. This can be done very simply, by selecting only the stoutest canes from a number of stools for seed purposes. These should be planted together on a small area (one-eighth of an acre, or even less), the sets being cleanly cut in order to minimise risk of invasion from fungi, and at the same time examined for evidence of redrot or weevil-borer, &c. If growers would take the trouble to plant a patch in this way, most of the resultant stools would be found to consist of stout canes, some of which would tend to be finer than any of the selected seed. By again using for plants the canes derived from a plot of this kind, a few acres of an improved strain, of uniform quality throughout the plantation, could be obtained in the shortest possible time. Such artificial selection is within the reach of every intelligent farmer; and since Nature's law, that like produces like is indisputable, any time so expended could not fail to yield a substantial return from a monetary standpoint.

"It should, however, be borne in mind that when growing a patch for seed in this manner the land chosen for the purpose should, if possible, be of uniform character, and receive similar treatment as regards manuring and subsequent cultivation.

"CAIRNS SHOW EXHIBITS.

"Some time was occupied this month in the preparation of entomological specimens and other exhibits for staging at the annual meeting of the Cairns Agricultural, Pastoral, and Mining Association.

"This took the form of coloured diagrams and charts illustrating, for the most part, the underground working and life-cycle stages of our principal cane-beetle, and the effect produced by same upon the growing crops during each month of the year; a small general collection of insects, including the eggs, grubs, and pupæ of the root-eating scarabaeidæ affecting cane; and other exhibits of a scientific nature dealing with the chief parasitic and predaceous enemies of our cane-beetles and their larvæ. The exhibition was well attended, and many growers availed themselves of our invitation to freely discuss the question of grub and beetle control, with the result that much interesting exchange of opinion took place regarding several complex phases of the all-absorbing cane-grub problem.

"EARLY HISTORY AND ORIGIN OF THE GRUB PEST.

"Damage to cane from the attacks of cockchafers is recorded as having occurred first at Mackay, as far back as 1872; and twenty-three years later (1895) when the trouble had assumed a serious aspect, Mr. Tryon was asked to investigate the matter and recommend measures for controlling the pest. About that time grubs were beginning to make their presence felt around Cairns, and we find Mr. S. W. Davids, the late manager of Mulgrave Central Mill, in his annual report for 1897, calling attention to the appearance of grubs and cane-beetles in various spots in the neighbourhood of Gordonvale, and suggesting that steps be at once taken to check the evil. His advice was acted upon, but, as is usual in such cases, the matter was not regarded seriously by the growers, and accordingly the following year Mr. Davids reported as follows:—"The ravages of the grubs are very evident, and unless steps are taken at every opportunity to destroy the grubs and beetles when met with, we may look for the same disastrous results, as experienced in other sugar districts."

"The above correspondence is doubly interesting from the fact that, in addition to throwing considerable light on what may be termed the prelude to an invasion that a few years later assumed colossal proportions, it also enables us to determine the source from which most of the present trouble originated.

"Data obtained by the writer in 1915 goes to show that infestation of the cane lands around Gordonvale was in the first instance brought about by beetles that did not originate in that locality, but were transported there from extensive breeding-grounds situated either in the vicinity of Aloomba or several miles eastward of that district. This view of the case is not merely theoretical, but may be taken as an established fact, verified by the experience of leading growers, many of whom have had unique opportunities of observing the gradual encroachment of this pest during the past twenty to twenty-five years. Mr. R. E. Riley, late Chief Cane Inspector at Mulgrave, who during his long residence at Gordonvale made many interesting observations in this connection, appears to have been the first to notice in the early days (1897) that our grey-back cockchafer bred habitually in enormous numbers around Aloomba over extensive areas supporting the so-called 'blady-grass' (*Imperata arundilacea*), which constitutes one of the commonest native food-plants of this beetle. Subsequent observations by the writer have shown also that its grubs subsist very freely on roots of other cereals, notably the 'carpet-grass' (*Paspalum platycaule*) that commonly covers recently cleared scrub lands.

"When cane was first planted at Gordonvale no serious injury followed until some years later, from which we may infer that when beetles are collected in any given locality others do not, as some growers imagine, immediately take their place, but reinfestation from the outside bush is a matter of time—perhaps of some years.

"Any beetles chancing to invade such cleaned-up localities the following season may, therefore, be presumed to come from adjoining cultivated areas that had not been collected over; so that benefit would result, as a matter of course, although not always to the deserving parties.

"If, however, a general systematic collection could be made throughout our district and kept up for a few years, destruction of the vast host which have gradually entrenched themselves and are breeding within the tract of country devoted to the cultivation of sugar-cane could hardly fail to afford a measure of relief.

"The foregoing evidence seems to me to be supported by experience in the past at Mackay, and, I believe, other sugar centres, where it has been noticed that when collecting has been given up—owing to a scarcity of beetles—a few years have generally elapsed before a fresh invasion of the pest has again called for action."

THE 1922 SUGAR ESTIMATE.

The General Superintendent of the Bureau of Sugar Experiment Stations states that, owing to the very dry weather experienced in the districts below Townsville during the usual wet seasonal period, it has been necessary to reduce the previous estimate of the Queensland sugar crop from 290,000 tons to 283,000 tons. This is only a rough estimate, as a warm moist winter may increase the yield as a dry frosty period would reduce it. This tonnage, however, if realised, will suffice for Australia's requirements, and with the production of New South Wales may leave a small carry-over. The production in 1921 for Queensland was 281,000 tons, and a good proportion of this was made up during the latter part of the season, which was very favourable, the earlier estimates being considerably less.

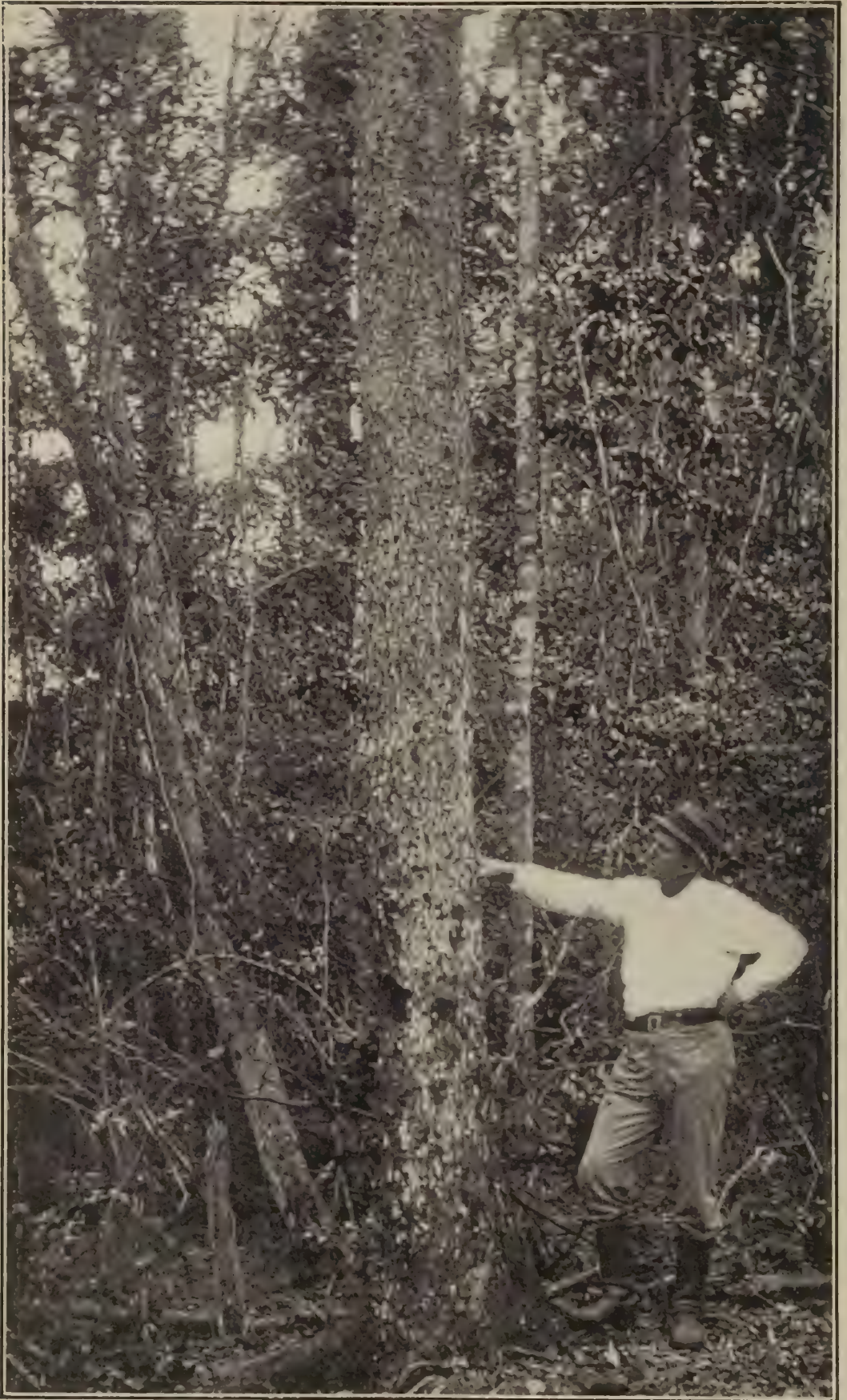
QUEENSLAND TREES.

By C. T. WHITE, F.L.S., Government Botanist, and W. D. FRANCIS,
Assistant Botanist.

No. 13.

THE CROW'S APPLE.

The Crow's Apple (*Owenia venosa*) is common in the drier scrubs of the coastal area of Queensland, from the border of New South Wales to Rockhampton, Queensland, in such places as Boonah, Rosewood, Benarkin, Nanango, Many Peaks, and as far west as Eidsvold. It is confined to Queensland. The trees attain a height of about 70 feet, and a barrel diameter of about 1 foot 6 inches. The barrel is not conspicuously flanged at the base. The bark is grey with patches of brown, very scaly, shed in square and oblong pieces, and when cut is purplish-brown, but paler towards the sapwood, measuring $\frac{1}{2}$ inch thick on a tree with a barrel diameter of 1 foot 3 inches. When grown in the open the trees form a shapely round head of dense foliage. The fruits are red, globular, 1 to $1\frac{1}{2}$ inches in diameter; the outer fleshy part surrounds a hard inner part, which contains from two to four cells, each cell containing a single seed.



Photo, by the Authors.]

PLATE 10.—THE CROW'S APPLE (*Owenia venosa*).
A specimen in the Imbil Scrubs.

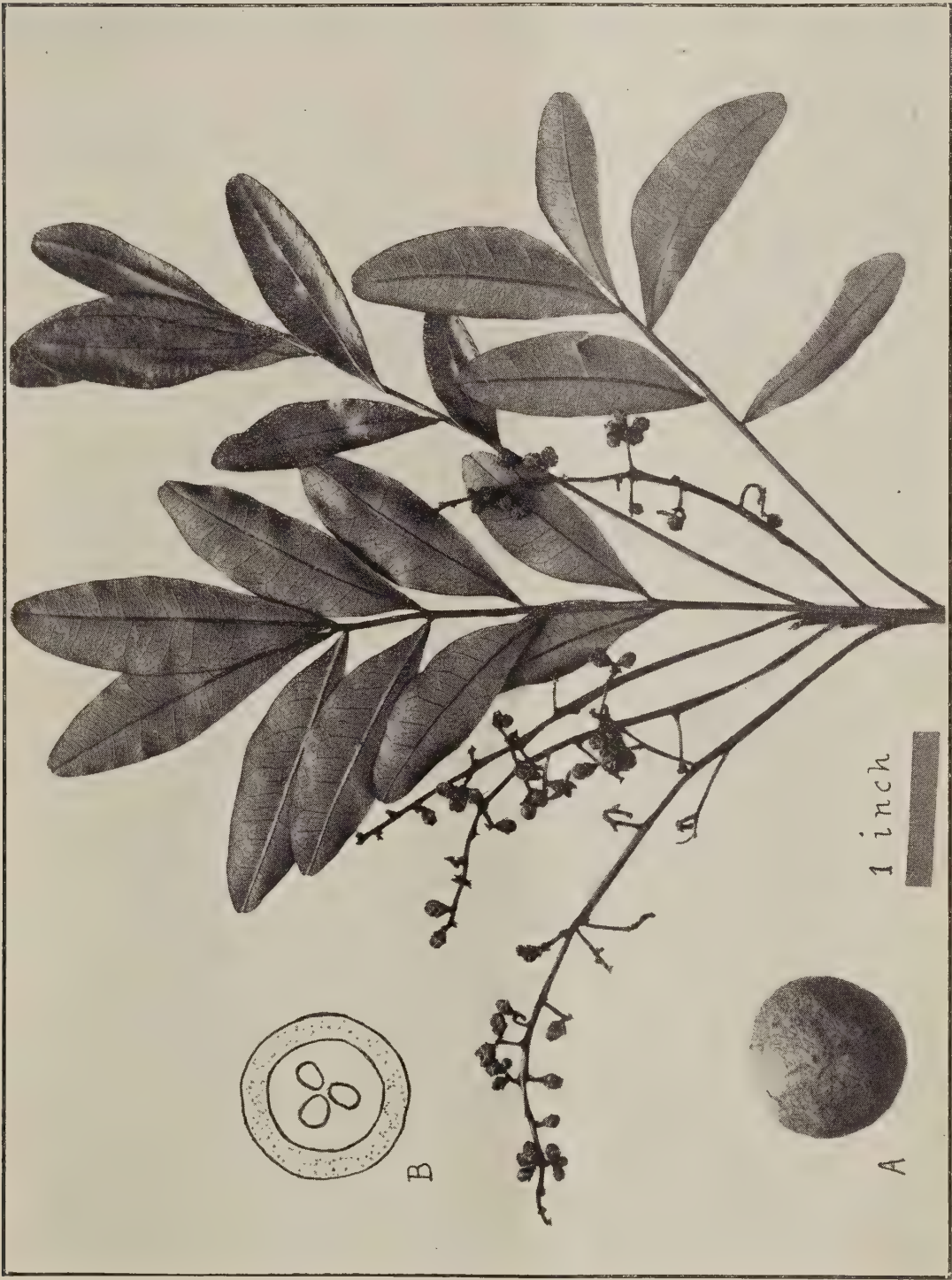


PLATE II.—THE CROW'S APPLE, FLOWERING TWIG.
A.—Dried fruit, B.—Section of fruit.

A CHILLAGOE ORCHARD.

By ERNEST B. FREEMAN.

Just 2 miles out of Chillagoe, and half a mile from the north side of the railway line, going to Mungana, is one of the heads of Metal Creek, and on it is situated the home of Mr. and Mrs. T. Vautin. The land, a piece of heavily-timbered forest, was taken up a little over ten years ago, and all the spare time and spare money during that time has been put into it.

In preparing the land for fruit-trees, Mr. Vautin used dynamite to blow up the subsoil, thus giving the tap-root a chance to go downwards, and enabling the tree to bear fruit upwards. The benefit of this procedure is visible to-day. A well was sunk and timbered, good water being struck at between 20 and 30 feet. A 1,000-gallon



PLATE 12.—PAW-PAW TREE GROWING ON MR. T. VAUTIN'S ORCHARD, METAL CREEK, CHILLAGOE.

tank was elevated on blocks several feet high. A lift and force pump were installed, the first power being supplied by a weighted cart-wheel which was used up to eighteen months ago, when a windmill was erected which supplies the power to-day. Except for the building of the cottage, Mr. Vautin himself has split the posts and erected the fences, and the goat and fowl house and yards. About sixty fowls and the same number of goats are kept on the place, as well as one horse. Even the windmill he put together himself, only getting assistance in its elevation. During all this time he has been ably assisted by Mrs. Vautin, who is a first-class housewife and maker of jams and preserves. When the Chillagoe Company closed down, Mr. Vautin went to Babinda, being away about two years, and Mrs. Vautin bravely bore

with the loneliness (they have only one child—a fine boy), and kept the home fires burning in the truest and best sense of the word. When Mr. Vautin returned to stay, he took up his home work where he had left it off, and he kept it going again. A few months ago he decided that he had enough planted to get a living with, and so commenced to hawk fruit and vegetables. One result of this is that he has had to secure assistance. To-day the orchard and garden show what a man and woman can accomplish when they are both agreed on the one objective.

The land tenure was miners' homestead lease, which has been raised to miners' homestead perpetual lease. The State Government is the landlord, the rent is low, the landlord is merciful, and there is plenty more land there on the same tenure.

Mr. Vautin has accomplished the above without raising a mortgage or even borrowing from the Agricultural Bank, so it is all his own, and neither rent nor interest day has to him any terrors.

One great enemy here is the white ant, which bores up into the centre of the trees. They may, however, be overcome by attention and cultivation.

A reliable supply of good water can be obtained anywhere by sinking from 20 to 40 feet. The climate is very equable, and the locality is free from frost.

THE SCRUB AND FOREST LANDS OF QUEENSLAND.

BY MAJOR A. J. BOYD, F.R.G.S.

About sixty years ago, when I was working a scrub farm only a few miles from Brisbane, which had a frontage to a fairly large creek (the Oxley, a tributary of the Brisbane River), several enterprising Southern farmers as well as new arrivals from Great Britain purchased land—some on the Darling Downs plains and others near the eastern cities, in order to be near a market for their produce, thus avoiding long land-carriage in the days of no railways and bad roads. Those who settled on the scrub lands near the coast had the advantage of water-carriage by tidal rivers and creeks.

One of the Victorian arrivals was a well-to-do farmer who was making his home on a large scrub farm. In the course of conversation he said: "Wheat-growing I have been brought up to, and I know how to manage on the Western country; but here, on this scrub land, is where I am 'at sea.' Here is where I want instruction in clearing this jungle, and in planting seasons and methods." It is, then, with a view to assisting the newcomer of to-day to start properly, and to manage a scrub farm properly, that I give the following hints, which are the result of many years' experience gained in the early days of rough farming in Queensland.

There is nothing new to-day as regards getting rid of the thousands of trees constituting what may well be called a jungle. There is no royal road to making the land bear a crop. It must be handled to-day as it was handled by us—the first settlers. It was felled with the axe, and the work demands some dexterity in the use of this invaluable tool.

Most of the riverside scrubs contain many valuable timber trees, such as red cedar and pine of three kinds (Bunya, Kauri, and Moreton Bay or hoop pine), but very little cedar is now to be found in districts where it formerly abounded; other timbers are yellow-wood, beech, and hickory. Thousands of feet of such timber have been burnt off in the early days of scrub farming. Obviously it would be unwise to destroy the valuable timbers mentioned, for which there is always a market. To fell scrub properly it is well, if possible, to select a time when the sap is down, and this occurs about the winter months, when the timber will dry quicker, and consequently burn off easier and more thoroughly than if felled when the trees are full of sap, although even this difficulty may be got over by judicious felling.

It is a common thing for scrub-fallers to cut half through a number of small trees and then to drop a large tree on top of them; when the large tree falls it naturally brings down all the smaller ones with it. But now mark the result. The small trees which were only half cut through are mostly not detached from the stumps. A strip of bark and timber on the uncut side still forms a connection with the roots, and consequently the sap continues to flow, and the tree, although felled, remains green, and, of course, will not burn well for months, and probably not at all until it has been handled a second time. "The longest way round is the shortest

way home'' is an old and a very good adage, and it applies to this case. By the method mentioned the trees will no doubt be quicker felled, but when we come to the clearing of them off the ground, then it is that we find out the mistake. But it is then too late; the mischief is done, and we can only make the best of it. This has been my own experience, and I have since cleared many acres of scrub, both on the coast and inland. [The practice nowadays is to nick the smaller trees with a belly and back cut, and this method ensures the bringing down of the saplings and small trees clear of the stump when the ''driver'' is felled.—Ed.] To fell scrub properly and obtain a good burn, the first thing to do with a standing scrub is to ''scrub'' or ''brush'' it—that is, to go through it with axe or a ''bill'' with a long handle, and cut down all the small trees, saplings, and shrubs under 6 inches in diameter, taking care to lay them flat by lopping any branches sticking up, and at the same time (in a vine scrub) all the vines, lawyer-canes, and other creeping and climbing vegetation must be cut to the ground and cleared as high as possible from around the larger trees. Neglect of this vine-clearing may lead to serious accidents when it comes to felling the timber.

Assuming this to be thoroughly done, we may proceed to deal with the larger timber and drop it upon the already partly dried small stuff. Every tree, as it is felled, should be lopped as to its branches, and the whole laid as flat as possible.

In proceeding in this manner we are simply carrying out on a large scale the building of a small fire. The small stuff lies below, the larger limbs above, and the heavy trunks above all.

Should the scrub contain many bottle trees or stinging trees, some trouble arises, as these are very large and pulpy, and contain such an enormous mass of moisture that they will not readily burn. My plan was to split up the nettle trees and allow the bottle trees to rot on the ground. The latter were very large and numerous on my scrub farm, ''Forest Hill,'' near Laidley, and gave little trouble, as they were easily felled and rotted rapidly. While the felled trees are drying the farmer has time to attend to preparing fencing stuff to be erected after the burn-off. The fence should not be erected until after the fire, say, about six or eight weeks after the last of the timber has been felled, according to the state of the weather. The best time to burn is at night if there is a nice breeze blowing. [The practice to-day in most scrub districts is to choose a hot, dry day, with the wind blowing from a suitable direction.—Ed.] I should have mentioned that the ''burn-off'' must not be deferred until the leaves have all dropped off the limbs. Should this have happened, a bad burn is almost sure to be the result.

Fire should be applied at several points at once, for it is a well-known fact that a large fire always creates a draught, and this materially helps to a good burn-off. If the timber has been well lopped, has lain a sufficiently long time, and a suitable day chosen for firing, it will be found that a clean sweep has been made of all the fallen timber, a few of the largest logs alone being left. These, however, will present no serious obstacle to subsequent planting operations, and will be easily got rid of later on.

In the case of a brigalow scrub, after a good burn scarcely any logs remain unburnt.

If the burn has taken place between August and December, corn-planting may be at once proceeded with. There will be no weeds to chip—the land presents to the view only a vast area of charred stumps and scorched ground, relieved by numerous patches of white ashes, still further enriching the fertile scrub soil. It is well to scatter the ash-heaps to utilise them to the best advantage.

Although the soil is apparently a mass of roots, these are generally soft and are easily cut through by a No. 3 breaking-up hoe.

Two crops may now be sown—viz., maize, and at intervals of from 20 to 30 feet; pumpkins may be sown on the same land without detriment to the corn crops. Rhodes grass may also be broadcasted along the rows, thus ensuring, in favourable seasons, a grassed paddock by the time the corn is ready to pull.

STUMPING.

Now, as to stumping the land to fit it for the plough:—It takes about three years for the general mass of medium-sized stumps to rot. The smaller ones will have disappeared in about two years, owing to constant cultivation of the soil and consequent destruction of the roots.

Various plans have been adopted at different times to bring the land under the plough. Some farmers used to break up the whole of the land intended for crops, taking the stumps out on a face. Others merely took out the stumps without breaking up the land, and, when stumps and roots were burnt, broke the ground up with a

strong bullock-plough—a work easily performed, as the tangled masses of roots are completely rotted by the end of three years. Once the plough can be set to work, the cultivation of the land differs very little from that adopted on plain lands. As already stated, the first crop generally sown on new scrub lands is maize. This is done easily with a breaking-up hoe or hand-planter, the soil being a rich alluvial, consisting mainly of the rotted accumulation of fallen leaves, trees, &c. The planter marks out a straight line through the maize of stumps by putting in stakes, with a piece of white paper or rag on the top, at intervals of 40 or 50 yards from the starting point. Then, by raising his hoe, as he advances in a line with the sticks, he manages to keep a fairly straight line. In later days an American hand-planter has completely superseded the old-fashioned hoe for maize-planting in scrub lands.

The seed was carried in a canvas bag, with a wide mouth, slung round the waist. One blow of the hoe is sufficient to make the necessary hole, into which from three to five seeds are dropped according to the soundness of the grain. A backward pushing of the seed and the planter then advances far enough to plant one foot on the last hole planted. The pressure will not harden the surface soil on the virgin scrub land; on the contrary, it just gives the pressure required to settle the soil over the seed. This regular advance brings him to the proper distance at which to make the next hole. The proper number of seeds is dropped, and so the process goes on till the whole field is planted. At intervals, as above mentioned, of, say, 20 or 30 feet, pumpkin seeds are dropped between the maize.

Now, a word or two about seed corn, which is a very important matter not to be neglected:—It has always been the custom with corngrowers to select the largest flat grains for seed. There can be no doubt that if the round seeds are sown the crop will turn out a poor one. I have made experiments with these round grains taken from the upper portion of the cob, and invariably the cobs have not filled properly. But there is one point in connection with seed corn which is perhaps not generally known, and that is that the largest grains do not always necessarily produce a large plant. The size of the embryo plant within the seed bears no relation to the size of the grain; of course, it can well be understood that the larger the seed the more food material there is to enable the plant to resist adverse influences and to enable the embryo to push its way up from a depth which would be fatal to a weaker germ. In this opinion I am borne out by the Agricultural Research Association of Aberdeen. So far back as 1896 the work done by that association was concerned chiefly with the cultivation of oats and the grass crops. With regard to the “dressing” or selection of oats for seed, the report said: “It has been proved by experiment that, contrary to what might have been anticipated, large seeds afford no ground for expectation of the production of large ultimate plants or heavier crops, nor do they secure any earlier germination. What they do secure is power to reach the surface, though deeply deposited, and a stronger beard, which will enable the plants to withstand uncongenial conditions of soil or season at the early stage of growth.

“The subject was followed up, and it was found by investigation that the size and strength of the embryo plant within the seed does not bear any relation to the size of the seed. Small seeds may often contain larger or stronger embryos than a large seed.” To continue my subject:—When the farmer has cleared his land and sown the seed, nothing remains to be done for the next four or five months in connection with the first corn crop, as there is little growth of weeds on the newly burnt-off soil, and no cultivation is required unless potatoes have been planted, as these will require to be hilled up.

In a favourable season, on such soil as I have described, the maize grows with extraordinary rapidity, and will throw up suckers here and there which should be removed. This labour is not great and the suckers provide good fodder for cattle, horses, and pigs. Just before the stalk begins to turn yellow the flowering tops may be cut off just above the grain cob. This will not injure the crop, as the pollen from the flower head has long ago performed its duty by fecundating the tassel of the cob, which now requires no more nourishment from it.

Corn should be pulled on dry days and not until the grain has set hard enough to resist the pressure of the thumb nail. This test also applies to the pumpkin, whose ripeness may further be ascertained by noticing that the curl at the stalk is withered. When the cobs are safely in the barn, husking should be done quickly, and the cobs should remain for some days to dry, as the drier it is the better it will thresh.

The forest lands suitable for agricultural settlement will form the subject of a future paper.

A NATIVE FODDER TREE FROM NORTH QUEENSLAND.*

By C. T. WHITE, F.L.S., Government Botanist.

Some years ago the late F. M. Bailey recorded a species of *Sideroxylon* for North Queensland as *S. arnhemicum* (a Northern Territory species), and at the same time quoted Mr. G. Jacobson to the effect that the tree was a valuable fodder species, stock being exceedingly fond of the leaves. I recently collected specimens of this tree in the Gilbert River district, and, in looking through our herbarium specimens, found we had the same species from several Northern localities under *S. arnhemicum* and *S. Pohlmannianum*. After examination of a large series of specimens, I have come to the conclusion that it is only a hairy form of the latter. I had at first thought it represented a new species intermediate between *S. arnhemicum* and *S. Pohlmannianum*, and had drawn up a full description of it. It was included by Mueller in his original comprehensive description of *Sideroxylon Pohlmannianum* (under *Achras* in *Fragm. Phytogr. Austr.* v. 184), but I certainly think it should at least be given distinct varietal rank and propose to name it as a new variety.

S. POHLMANNIANUM var. *VESTITUM* n. var. *varietas nova foliis utrinque dense pubescentibus.*

Description.—A tree 25–30 feet high with a dense spreading head, branchlets rather stout, prominently marked with the scars of old inflorescences, younger parts densely ferruginous-pubescent. Leaves softly and densely pubescent on both faces, lanceolate or elliptic, petiolate, petiole $\frac{1}{4}$ –1 inch (.7–1.5 cm.) long, $1\frac{1}{2}$ –2 inches (4–5 cm.) broad. Flowers in dense clusters at the old nodes below the leaves, pedicels $1\frac{1}{2}$ lines (3 mm.) long, softly pubescent. Calyx-segments 5, densely pubescent outside, very much imbricate, orbicular, about 1 line (2 mm.) in diameter. Corolla lobes 5, truncate, slightly longer than the calyx. Ovary surrounded by a dense ring of long hairs, 5-celled. Fruit more or less globular about $\frac{3}{4}$ -inch (2 cm.) in diameter. Seeds compressed, 6–7 lines (1.3–1.5 cm.) long, 4 lines (9 mm.) across, dark brown, hard and glossy, hilum or scar nearly the length of the seed. *S. arnhemicum*, Bail. Bot. Bull. v., Depart. Agric., Brisbane, p. 19 (1892); Queensland Flora, pt. iii., p. 956 (1900), not *Achras arnhemica* F. v. M.

Habitat.—Gilbert River, C. T. White (type); Musgrave (Cape York Peninsula), Geo. Jacobson; Endeavour River, W. A. Persieh; Ollera Creek, near Townsville, W. Young; Walsh River, T. Barclay Millar. So far as known, confined to North Queensland.

Properties.—The late F. M. Bailey (l.c.) quoted Geo. Jacobson to the effect that cattle and horses are very fond of the foliage, and that in times of scarcity of feed the tree is cut down for fodder. W. Young, in sending specimens for identification from Ollera Creek, North Queensland, stated that stock were very fond of the leaves. Mr. F. Turner (Proc. Linn. Soc. N.S. Wales., vol. 41, p. 101), quotes Mr. A. H. Cooper to the effect that *S. arnhemicum* is a valuable fodder tree in North Queensland; most likely the tree now described is referred to.

Botany.—The normal form is common in many parts of the State, but we have no record of its being used as fodder. I have no doubt, however, it will be found equally useful when tried, as will also most likely the true *S. arnhemicum* from the Northern Territory. The three trees are very much alike in character, the chief distinctions being—

Leaves pubescent on both sides.

Leaf blade broadly elliptic, 3–3 $\frac{1}{2}$ inches (7.5–9 cm.) long, 2–2 $\frac{1}{2}$ inches (5–6.3 cm.) broad, tapering into a petiole of 1–1 $\frac{1}{2}$ inches (2.5–3.7 cm.) flowers 6-merous (?). *S. arnhemicum*.

Leaf-blade lanceolate or narrow elliptic, blade 3 $\frac{1}{2}$ –6 inches (9–15.5 cm.) long, 1 $\frac{1}{2}$ –2 inches (4–5 cm.) broad, petiole $\frac{1}{4}$ –1 inch (.7–1.5 cm.), flowers 5-merous. *S. Pohlmannianum* var. *densevestitum*.

Leaves, with exception of the midrib and main lateral nerves, green and glabrous on both sides. *S. Pohlmannianum* (type).

Acknowledgment.—I am indebted to Mr. W. Laidlaw, B.Sc., Government Botanist, Melbourne, for loan of type material of *S. arnhemicum* from the National Herbarium for purposes of comparison.

* As this article describes a new variety, and is of some botanical interest, it is unavoidably somewhat technical. A brief Latin diagnosis of the variety is given in accordance with the International Rules of Botanical Nomenclature.



PLATE 13.—A NATIVE FODDER TREE (*Sideroxylon Pohlmannianum* var. *vestitum*).

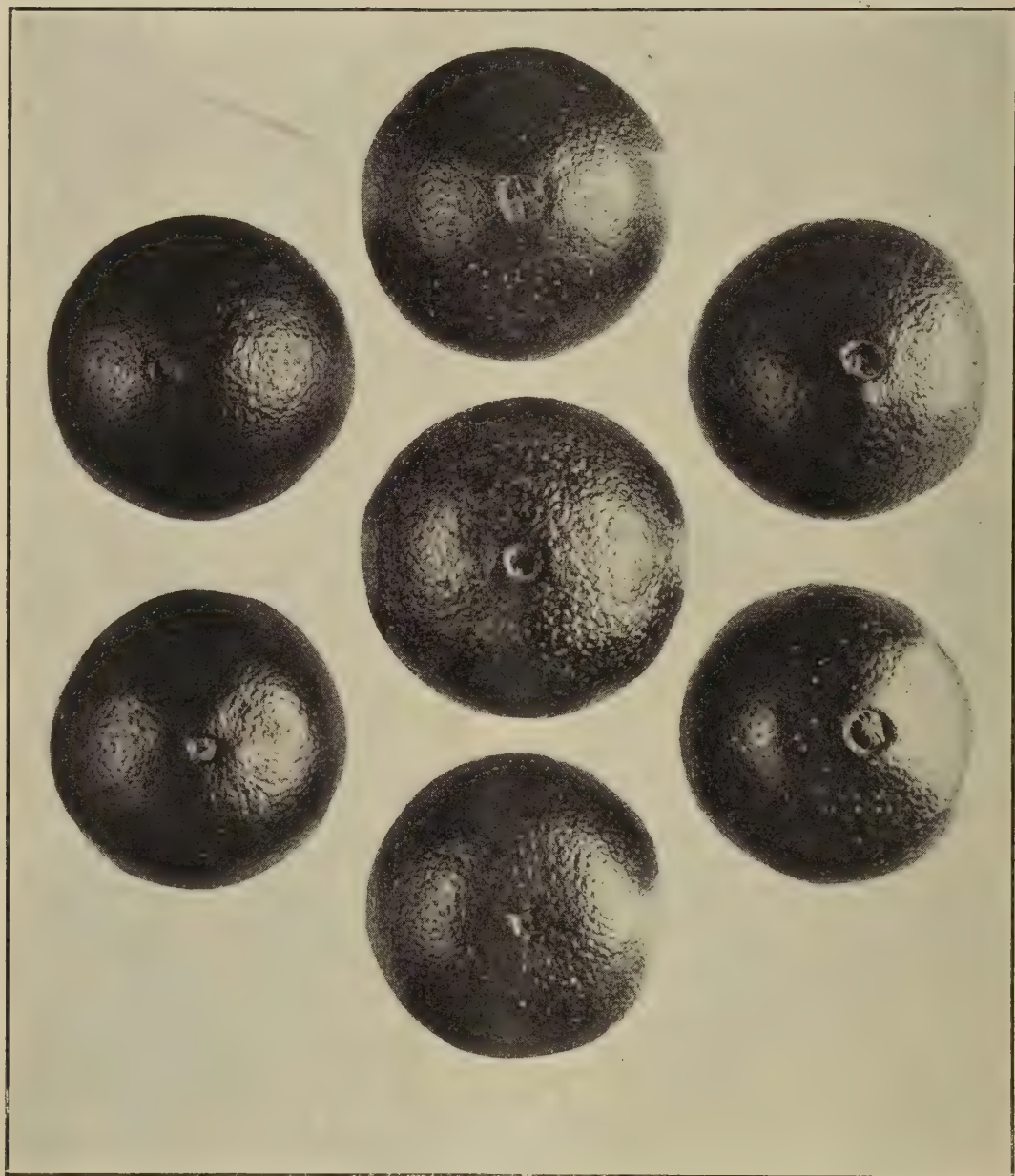


PLATE 14.—NAVEL ORANGES GROWN BY MR. C. ROBINS, MIRIAM VALE, ALPHA,
CENTRAL WEST.

ELECTRIC MECHANICAL COTTON-PICKER.

C. D. Wagoner, writing to the "Farm and Live Stock Record" (United States, America), gives a most favourable report by Mr. L. C. Stukenborg, a resident of Covington, Kentucky, United States, America, on the latest invented machine for cotton-picking, for the manufacture of which a strong company has been formed under the name of the Cotton-Picker Company of America. The original machine was put to the first test in 1917, and since that time many valuable improvements have been added to the invention. The company has prepared and issued an exhaustive pamphlet dealing with the five great factors of the cotton crop and how to correct them. These factors are cultivation, harvesting, ginning, spinning, and weaving.

For the present we need only consider the matter of harvesting. We know that many devices relative to cotton-picking machinery have been invented in the past, and some of them have been described and illustrated in the "Queensland Agricultural Journal." One machine was invented and built in Brisbane some years ago,



PLATE 15.—STUKENBORG ELECTRIC COTTON PICKER.

and its work was demonstrated by the inventor, Mr. Daniel Jones, a cotton-grower in West Moreton in the days when cotton-growing was taken up and appeared to have become an established industry in Queensland during the Civil War in America. The machine did fairly good work, but shared the fate of most of its predecessors.

When the machine now to be described was invented by Mr. Stukenborg, his greatest difficulty was to remove the cotton from the brushes which swept the ripe cotton from the tree, but in this he eventually succeeded.

The crude and primitive method of picking cotton is to a very great extent responsible for the many abuses of the cotton crop, resulting in some enormous losses. Picking is the most expensive item in the production of the cotton crop. One man can cultivate as much cotton as five or six good pickers can gather. This is almost prohibitory; therefore the labour required to gather the crop should be equalised with the labour necessary to cultivate the crop.

Cotton picked by hand is injurious to the fibre. In pulling it from the boll the action of the fingers on the fibre as it accumulates in the hollow of the hand puts it through a twisting, rolling, matting, and squeezing process, and when placed in the sack or receptacle it resembles snowballs. Also, the fingers take in all the dirt, leaf, and trash, and mix it through and through the cotton fibres, so that it becomes very difficult to remove, and it *must be removed* before the spinning operation takes place. Hand pickers leave the cotton in a terrible condition. To make matters worse, it is again abused by being dumped here and there, only to be tangled, wadded, and pressed all the more compact; and therefore it cannot cure itself properly. It is then taken to the gin to be assassinated, which destroys much of its value, divisibility, durability, and strength. Being in that condition, there is little doubt that the gin

saws will cut and tear the fibres all to pieces, affecting materially the uniformity of staple, grade, and classification. Hence the producer pays the price in a lesser price received for his cotton for want of a good mechanical cotton-picker.

Such a machine has apparently been invented, and is known as "The Stukenborg Cotton-Picker." It is not merely an experiment, but a real machine which coaxes the cotton out of the boll. It does not injure the fibre as is done by hand-picking. The lint on each seed is more or less cleaned, straightened, and laid parallel. This gives the cotton an opportunity to dry and cure properly, and it emerges fluffy, white, and free of all foreign matter such as boll-dirt, leaf, parts of stalk, and sand.

The machine pulls the cotton from the bolls by means of two cylindrical brushes revolving inwardly, and the cotton is combed from these by a cylindrical take-off device.

There are four picking tubes to a machine. Supported overhead by a balance arrangement, the pickers are suspended with such lightness and flexibility that even a child could shift them about with ease. The machine, as it passes through the field, can pick eight rows. A labourer finds no trouble in using it; and in checking up his work it has been found that where he formerly picked 100 lb. by hand he has been picking 400 lb. by machine with only a few days' training. Each machine carries a complete electric power plant. The tractor engine furnishes sufficient electric power to operate the eight motors required to run the machine. The brushes in the leads are driven by a flexible drive-shaft about 3 feet long, which is connected to a small motor suspended about halfway down the suction tube. After the cotton completes its trip through the tube, and just before it drops into the bag, it is given a thorough cleaning, another motor operating a blower as well as supplying the suction power.

We have not seen the above-described machine at work, and therefore what is here stated is necessarily matter supplied by a pamphlet explaining its mechanism and method of picking the cotton. If what is stated in the brochure is correct—and we are not in a position to criticise the statements therein put forward—then the sooner one or two machines are sent by the company to Queensland, to be given a fair trial, the better for the company, should conditions here enable its work to be carried out profitably to the cotton-grower.

BASIC SLAG PROBLEMS.

The "Planter's Chronicle," Cumbernure, India, states that a committee of the Ministry for Agriculture which has been investigating this question obtained returns from steelmakers of their production of slag in 1920, and found that something like only a sixth of the amount of high basic slag turned out before the war is being produced now, and that even this small amount cannot be relied on in the future. There is, however, a larger output of lower grades of slag than in the pre-war period.

The 260,000 tons of high-grade slag of pre-war days contained 9,880,000 units of phosphate.

The 700,000 tons of slag produced in 1920 contained 15,200,000 units, and 560,000 tons out of this quantity, with 13,400,000 units, were of grades containing 15½ per cent. and upwards of phosphates.

It is agreed that practically the whole of the phosphorus entering the ironworks is accounted for in the figures given above. It follows that if the output of steel remains constant, the slag figures will remain substantially as they are, except that the highest grades will tend to become scarcer and the others proportionately to increase.

Dr. E. J. Russell, of Rothampstead, reports that the basic slag produced to-day is very inferior to that produced in 1914, which gave 40 per cent. of phosphates. This is attributed to the changed methods of producing steel. "Open-hearth" basic slag yields only 15 to 30 per cent. of phosphates. Some of it was of the same solubility as that of 1914, and gave proportionate results, but the fluorspar slag produced at present is much less soluble and not so efficient. Dr. Russell does not see much prospect of improvement, for the reason that the slag is worth only a few shillings to the manufacturer while the steel is worth pounds.

In the pre-war days farmers were advised to use only slag of high solubility, and that sold by the best firms had a solubility of 80 per cent. and upwards; but now that the process of manufacture has changed, experts are no longer agreed as to the desirability of a high soluble slag. The latter will come into action sooner than slag of lower solubility, and so a larger return may be expected in the first

season. It is possible, however, that in later seasons the lower-soluble slag may grow in effectiveness, and at the expiration of some years there may be a little difference between the two; this has been considered to be proved by actual experience.

A fertiliser has been put on the market under the name of "Slag phosphate," which is a mixture of low-grade basic slag with Nauru phosphate, ground to a fineness of only 60 to 70 per cent., and sold as containing 45 to 50 per cent., or 50 to 55 per cent., of phosphate of lime, no statement being made by the vendors on the invoices as to their solubility. Actually none dissolves in water in the same manner as the soluble phosphates in superphosphate dissolve, and on testing the mixture called slag phosphate in 2 per cent. citric acid, an analyst found that only 13½ per cent. dissolved, out of a total of 52 per cent. of phosphate. It is evident, therefore, that when submitted to the same laboratory test, high-grade slag is about three times as soluble in citric acid as the slag phosphate. Though this test cannot be taken as a measure of the fertilising value of the two phosphates, it does indicate that phosphate of lime in the slag will often be more quickly effective than that in the mixture.

"Ephos" Phosphate.—A fertiliser sold under this name is a natural phosphate from Egypt, containing 62 per cent. of insoluble phosphate and 20 per cent. of carbonate of lime, with a fineness of 84 per cent. It has been shown from actual experiments to yield results comparable with those obtained from basic slag, but less effective than those obtained from equal quantity of superphosphate, owing to the soluble phosphate content of the latter.

THE HUMAN MACHINE ON THE LAND.

Mr. W. J. Malden, who writes on this subject in "The Journal of the Ministry of Agriculture" (London), is evidently a man who has had large experience in farming and in the training of what he calls "the human machine" for farm work. Following are short extracts from this paper, which appeared *in extenso* in the journal mentioned:—

"It is not necessarily the strongest labourer who does the most work or who is the least tired at the end of the day. Much labour at the present time employed in arable farming is inefficient, and consequently energy is misdirected. Assuming that 100 per cent. represents the efficiency of a labourer of all-round skill, the average for the whole country to-day (in European Britain) is not more than 60 per cent. Something like £100,000,000 is paid yearly in wages. Forty per cent. wasted through inefficiency is a big charge on the land and on the country. When several millions of acres went from the plough in the 'eighties and 'nineties of the last century, and the rural population largely drifted into the towns and industries, the farmers lost a big portion of the highly skilled men and many of their more promising sons. Roughly, £1,000,000,000 was estimated to have gone out of farms and land capital in those years, and a proper wage reward could not be paid to the labourers. The war made a heavy call on the man on the land, and many skilled labourers have, as a result, been lost to the industry.

"Without skilled labour full farming cannot be carried on, but what signs are there that anything is being done to train men to a higher efficiency? Yet the time must come when much of the land will go out of cultivation, unless workmen be endowed with more skill. We are in a fairly mechanical stage on the land, and, doubtless, invention will come further to our aid; but though a percentage of trained mechanics will be required, it seems perfectly safe to state that, in a few years, a highly-skilled farm worker will command very high wages. The skilled man on the land, able to turn to any kind of live stock, good in the hay-time and harvest, a skilled hedger, in fact not lost anywhere, has become a very rare man. If he can do a few of these things really well, he can pretty well make his own terms and he will be in greater demand as years go on.

"In many districts labour has so fallen in skill that farmers have accepted a very low standard, being, in fact, glad of anything that will see them through at all. The farm worker has descended very much from a farm artisan to a farm labourer; he is often possessed of little skill, and, having little joy in his work, cannot take the pleasure in it that his fathers did. Work done in that way becomes drudgery.

"In saying this one makes many exceptions. In all ways, something is needed to bring about better conditions, to give the farm workers a greater interest in their occupation, and to make their lives more valuable to themselves and to others. Interest must be aroused in their work. They should be made skilled so that they may feel an honest pride in their work just as they should in their play.

“FARM LABOUR AS FARM ATHLETICS.

“I have always regarded physical work on the land as farm athletics. This is probably due to the fact that I was reared in a district where work was exceptionally skilled, and where competitions in the arts of husbandry excited as much interest as a local football match does to-day. As a native of Bedfordshire, I was brought up under the direct influence and outcome of those remarkable historic Woburn sheep shearings which began towards the end of the 18th and continued into the 19th century. It was in them that the great effort of the Dukes of Bedford, Coke of Holkham, Ellman of Glynde, and other giants of those days set themselves to wake up farming from the sleep in which it had slumbered for some centuries. These gatherings were notable in that they instituted in a broad manner competitions by workmen in acts of husbandry. These farm workmen's competitions acquired world-wide repute, and before the 19th century opened, a few county agricultural societies were founded, mainly to further skill in farm labour. Naturally from immediate association Bedfordshire inaugurated a society; and until quite late in the century, when hard times in farming stopped them for a few years, the competitions aroused the greatest enthusiasm, and exercised a big influence. Farmers and workmen shared equally in the spirit of emulation aroused, and the county ploughing matches even sixty years ago were the hunting ground where the large agricultural machinery firms sought men of skill and resources to be taken to demonstrate the value of their implements and machines throughout the world. Further, the market gardens and the seed-growing areas in the Biggleswade and Potton district developed men of skill in the handling of tillage tools. Thus, in that and the surrounding counties, arose an all-round skill hard to excel. Skill made work easy to the men, competitions aroused enthusiasm, and enthusiasm led men to work with a will. It was not a question of one man being set apart to do a particular job; every man expected to be an all-round hand.

“SUGGESTED INTER-COUNTY COMPETITIONS.

“There are many men farming successfully to-day who owe their success mainly to taking up farms where their predecessors had trained the men to skilled work. Had they not found them they could not have trained them. It is of little use to find fault with bad work if one cannot show the man the right way. In rather a widely varied life on the land I have found nothing so valuable to me as those few years when I took part in and learned farm work from the skilled artisans amongst whom fate threw me, and every youth going on to the land should make as much study of it as of any other section. I should like to see teams of young farmers of one county challenging those of other counties in a wide range of acts of husbandry; inter-county contests between the farm workmen, with a challenge shield for the best county; and inter-school contests between schools in different districts. It would be far more exhilarating than seeing two parishes playing indifferent football! Few have thought what a lot may be learned in farm work in a village school playground; and how a simple training may teach much that is useful. All sports and physical work should be learnt when one is young.”

(TO BE CONTINUED.)

PROTECTION OF SHEEP FROM BLOWFLIES.—II.

REPORT OF THE SPECIAL BLOWFLY COMMITTEE OF THE INSTITUTE
OF SCIENCE AND INDUSTRY.

JETTING.

As is well known, the blowflies generally attack sheep on the breech. So frequently is this the case that it is often taken for granted that if the breech is protected the sheep is protected. In the past some protection was obtained by clipping the wool from around the breech, called “crutching”—an expensive operation, and particularly rough on ewes carrying lambs, and not much protection in a bad fly attack.

Early in the year 1912 the manager of Orion Downs Station, in Queensland, protected the breech by poisoning the wool around it with one of the proprietary arsenical solutions. To get the arsenical solution to penetrate the wool to the skin he forced the solution through a small jet at a fairly high pressure. He thus obtained better protection than with crutching, and at a lower cost. The method

was tried out later at the Government Sheep Experimental Station at Gindie, in Central Queensland, and good results were obtained there.

When the experiments were started by the Institute of Science and Industry Committee, at Dalmally, this method of protection, which through the method of application had come to be called "jetting," was closely investigated. Practically all the specifics on the market were tried, and some of them many times and at different strengths. Only those containing arsenic gave protection, and the protection was found to be proportional to the arsenic present. At the same time, experiments were made by jetting the sheep with a solution of plain commercial white arsenic dissolved in soda ash. It was found that this was not only very much cheaper than any made-up specific, but was easier to work, and gave better protection.

After many hundreds of experiments and jetting many thousands of sheep, we have found, contrary to general belief, that comparatively strong solutions of arsenic not only give the best protection but are absolutely harmless to the sheep or to the quality of the wool. Our experience has since been verified by the use of the process in Queensland by pastoralists on many hundreds of thousands of sheep each year. In our experiments the proportion of arsenic was never taken for granted, even when most carefully made up. A sample of every solution used was invariably sent to the Government Analyst in Brisbane, and the proportion of arsenic was determined by analysis.

On one occasion fifty sheep were jetted with a 1.5 per cent. solution of arsenic, without any symptoms of poisoning showing. Thousands have been jetted with a 1 per cent. solution, and in not a single instance was any harmful result noted. Experimental flocks of sheep, when jetted, were always accompanied in the paddocks by about fifty sheep not treated in any way, so that comparisons might be made as to the protection given.

STRENGTH OF SOLUTION.

As a result of the investigation, we found that a strength of 0.7 per cent. of arsenic gave sufficient protection, but less than that strength only protected for a shorter time.

TIME OF PROTECTION.

In ordinary weather, jetting with a 0.7 per cent. arsenic solution will protect for three months or more, but in very wet weather the arsenic may be washed out more quickly. Reattack, necessitating rejetting in six weeks is the shortest period of protection we have noted.

MAKING UP SOLUTION.

We have found the grey arsenic supplied by the State Government quite pure enough for this work, as it averages about 93 per cent. and is very much cheaper than the ordinary white arsenic. Commercial soda ash dissolves the arsenic readily. To make 100 gallons of solution, the water is boiled and 1½ lb. of soda ash are added. While the water is still boiling, 7 lb. of white arsenic (or 7½ lb. of grey arsenic, to allow for impurities) are added, and the mixture is boiled for twenty minutes. After standing to cool, there should be no sediment if white arsenic is used, and only a slight greyish sediment if grey arsenic is used.

MACHINE.

A pump to deliver the solution at from 60 lb. to 200 lb. pressure per square inch is required. The pump may be run by a special engine or from the shafting of the shearing machinery where that is available. With the pump at the middle of the race, a 30-foot hose will reach each end.

SIZE OF JET OR NOZZLE.

Jets wear quickly where sulphur is used, as it was in many of the earlier experiments with made-up specifics. One-sixteenth of an inch has been found most effective, though, with dense-woolled, full-fleeced sheep, a three-thirty-seconds jet is better.

PRESSURE.

The pressure required varies with the amount and density of the wool and the amount of burr and seed on the surface of the wool. With from four to six months' wool, about 100 to 125 lb. pressure has been found best; and, with a full fleece, about 200 lb.

MAINTENANCE OF PRESSURE.

It is very important to maintain a steady pressure. A large air-chamber is essential, and it must be absolutely free from leaks, so that the gauge will show a steady pressure when jetting sheep after sheep.

AMOUNT TO USE.

About a pint and a-half will be found sufficient for each sheep, the amount varying with the growth of wool.

HANDLING THE SHEEP.

The sheep should be penned in a race about 60 feet long by 2 feet 9 inches wide by 2 feet 9 inches high. The race should be floored with 3-inch round rails, which project about 18 inches to give a working platform. The flooring should have a fall of about an inch and a-half away from the operator to keep the drainage away. The cost of the arsenic solution is so low in this method that it is not essential to catch and again use the small amount of drainage.

TIME TO JET.

If ewes are due to lamb and the fly is not about, jet as close to lambing as is advisable. In other sheep, jet as soon as the fly attack begins. This will stop all infestations, kill innumerable flies, and generally give immunity till that particular fly attack finishes. Up to 3,000 per day can be jetted by four men with a plant such as described above.

COST.

The cost of this method of protection has been found to be very low, the jetting solution, prepared as above, costing about one-fifth of a penny per sheep. Three jettings per annum, therefore, means three-fifths of a penny per head per annum—quite a reasonable cost.

RISKS.

Arsenical solutions are always dangerous. If carelessly made up, when too weak they will give no protection; when too strong they may cause poisoning. With ordinary care in weighing the arsenic and soda and measuring the water, there is no risk of loss. In jetting many thousands of sheep with solutions containing from 0.7 to 1.0 per cent. of arsenic we have not had a single case of poisoning.

OTHER EXPERIENCE.

Many pastoralists have found this method gives good protection. Here is one instance:—Mr. Linton, of Mount Abundance, whose sheep—full-woolled hogget ewes—were badly struck, applied to Mr. Russell, who gave him all information. Mr. Linton used the solution as directed, and on the shearing board, in six weeks, out of 12,000 hoggets, only three were found to be struck, while sheep on surrounding stations were still being attacked.

In regard to the poisoning of flies, we reason thus:—The fly must get rid of her burden of eggs or larvæ. It is mostly the breech which is attacked. If the larvæ are deposited on poisonous wool they cannot thrive. This has been shown conclusively by repeated experiments. Then, instead of deterring the fly from attacking the breech, let us attract her there, or she will attack other parts of the body of the animal. In short, we shall make a fly-trap of every sheep attacked—a cheap and effective trap—for past the poison there are no live larvæ to develop into flies.

PURITY AND GERMINATION OF AGRICULTURAL SEEDS.

By F. F. COLEMAN, Expert under the Pure Seeds Acts.

Under the Pure Seeds Acts the seller must give to the buyer an invoice, stating the kind or kinds of seeds and that such seeds contain no greater amount of foreign ingredients than is prescribed by the Regulations. It therefore follows that every vendor should know the purity and germination of the seeds that he is selling or offering for sale. Without this knowledge he cannot honestly give the required invoice.

A vendor is any person who sells, or offers or exposes for sale, or contracts or agrees to sell, or deliver any seeds. In other words, an Auctioneer, Storekeeper, Produce Merchant, Seedsman, Grower of the seed, or any other persons, are vendors whenever they sell or offer for sale any seeds as seeds for sowing. Section 6 of the Regulations provides for the sale of "As grown" seeds to seed merchants to be cleaned and graded by the merchant before being offered for sale as seed for sowing. The sale by farmers of "As grown" seeds is therefore limited to such merchants as are in possession of one or more efficient seed-cleaning machines. A farmer is a vendor under the Act whenever he sells to another farmer or to any other person, and must give an invoice, as required by the Act. The only exception is the sale of "As grown" seeds to merchants for cleaning and grading.

Every purchaser should know the purity and germination of the seed that he intends to buy or sow; also its freedom from diseased or insect-infested seeds. These matters can only be decided by a thorough examination of a large and truly representative sample drawn from the actual bulk in the sender's possession. Seeds constitute the most variable material that the farmer or merchant purchases, and the success or failure of a crop, or even succeeding crops, may be wholly determined by the kind or condition of the seed sown. No one can afford to leave any doubtful point to chance, and it is but common prudence to ascertain the *purity* and *germination* of all seeds purchased, before sowing or offering them for re-sale.

Both buyers and sellers may send samples to the Department of Agriculture and Stock for analysis. When the information is required for commercial purposes a fee of 2s. 6d. per sample is charged. No charge is made to farmers sending in samples of the seeds that they have purchased for their own sowing, providing the following particulars are plainly written on each sample:—

- (1.) Vendor's name and address.
- (2.) Name of seed.
- (3.) Quantity purchased.
- (4.) Date of delivery.
- (5.) Locality where seed is to be sown.
- (6.) Name and address of purchaser.

If the sender of the sample has not omitted to put his name and address thereon (and hundreds of such samples reach the Department every year), a reply is sent in the form of a report, or certificate, which gives particulars as to the purity and germination of the sample received. Unless the sender is careful to forward a truly representative sample, the reply is valueless. Under no circumstances is it a guarantee of the bulk, but a plain statement of the facts revealed by the analysis of the sample received.

A certificate gives the following particulars:—Percentage of pure seeds, inert matter and weed seeds, ascertained by weight; also the names of the principal weed seeds, and the percentage of dead and non-germinable seeds that the pure seeds contain, ascertained by a germination test; and in the case of such seeds as lucerne and cow peas, the percentage of hard seeds. Hard seeds are seeds with coats so impervious to water as to delay germination. If the amount of hard seeds is more than 10 per cent., it is obvious that the effective germination of the sample is greatly reduced.

The percentage of germination is not given in the certificate, but if the percentage of dead and non-germinable seeds in lucerne amounted to 15 per cent., and the amount of hard seeds to 10 per cent., the germination would be 75 per cent.; in other words, 15 per cent. plus 10 per cent. deducted from 100 leaves 75 per cent. The percentage of purity is the percentage of pure seeds that the sample contains; if a sample contained .7 per cent. of weed seeds and 1.3 per cent. of inert matter, the purity is 98 per cent., as the amount of weed seeds plus the amount of inert matter amounts to 2 per cent., which figure, deducted from 100, leaves 98. The real value of a sample, or the number of pounds of pure germinable seeds that the sample contains, can be arrived at by multiplying the purity by germination and dividing by 100. As an example, we will suppose a farmer purchases 100 lb. of Rhodes grass seed at 1s. 6d. per lb., which on analysis is found to contain $\frac{1}{2}$ of 1 per cent. of weed seeds, and $1\frac{1}{2}$ per cent. of inert matter, and the pure seeds have a germination of 60 per cent., the real value of the seed would be $98 \times 60 \div 100 = 58$ lb. Putting it in another way: the farmer who sows the seed gets a sample containing 58 per cent. by weight of Rhodes grass seed, which under favourable conditions will germinate. Supposing he purchases a similar quantity from another source and received seed with a purity of 43 per cent. and a germination of 13 per cent., the actual value of the seed would be $43 \times 13 \div 100 = 5\frac{1}{2}$ lb. The buyer who purchases 100 lb. of the first sample, at 1s. 6d. per lb., pays £7 10s. for 58 lb. of germinable seed, or 2s. 7d. per lb. for the good seed. With the second sample, at 1s. 6d., he would pay £7 10s. for $5\frac{1}{2}$ lb. of seed, or 27s. 3d. per lb.

It is obvious that the best is cheapest, and quality should be the one and only consideration that determines a purchase.

FOREIGN INGREDIENTS.

Foreign ingredients include dead and non-germinable seeds, hard seeds, diseased or insect-infested seeds, weed seeds, or seeds of any cultivated plant other than that to which the sample purports to belong. Also inert matter, which includes chaff, dust,

stones, or any material other than seeds, and broken seeds less in size than one-half of a complete seed.

The percentage of weed seeds, inert matter, dead and non-germinable seeds, and other foreign ingredients that may be contained in the different kinds of seeds are prescribed by the Regulations, copies of which may be obtained from the Department of Agriculture.

“B” grade seeds are seeds in which the amount of foreign ingredients exceeds the proportion set forth in Schedule A of the Regulations, but does not exceed the proportion set forth in Schedule B, such seeds may be sold as seeds for sowing, providing they are contained in bags or packages to each of which is affixed a label, brand, or stamp, clearly and indelibly marked, specifying: The kind or kinds of such seeds; that the seeds are “B” grade, for planting or sowing, and contain no greater proportion or amount of foreign ingredients than is prescribed; also the name and address of vendor. All invoices relating to such seeds must be distinctly marked “B” Grade Seeds.

INVOICE MUST BE GIVEN BY VENDOR.

On the sale of any seeds of not less value than one shilling the vendor must give to the purchaser an invoice stating that the seeds are for planting or sowing, the kind or kinds of such seeds, and that they contain no greater amount of foreign ingredients than is prescribed.

The actual wording on an invoice should be—

“The seeds mentioned on this invoice are for planting or sowing, and contain no greater proportion or amount of foreign ingredients than is prescribed for such seeds.”

WEIGHT OF SAMPLES.

All samples of seed sent for analysis must not be less than the weights herein set out, and in the case of seeds containing foreign ingredients double the weight mentioned should be sent.

Wheat, Oats, Barley, Maize, Rice, Rye, Cowpeas, Tares, Peas,	
Beans	8 oz.
Lucerne, Sweet clover, Sorghum, Sorghum sudanense (Sudan grass), Panicum, Millet, Linseed, Canary, Prairie grass, Buckwheat, Cotton	4 oz.
Rhodes grass, Paspalum dilatatum, Rye grass, Cocksfoot, Couch grass	2 oz.
All agricultural seeds other than those included above	2 oz.

It is of the utmost importance that the samples be drawn by the sender from the seed in his actual possession, care being taken to obtain a small lot from each bag, carefully mixing them together in order to make the sample truly representative of the bulk. All samples must be marked with **name of seed, quantity it represents, marks (if any)**, and last, but not least, the **name and address of the sender**. Unless these particulars are plainly written on the sample delay will ensue. A covering letter should be mailed advising of the despatch of the samples, and enclosing the fees, if such are payable.

Although buyers and sellers are able to form a good idea of the market value or price, experience shows that they are frequently misled as regards purity and germination. It is impossible to determine the amount of weed seeds, non-germinable seeds, hard seeds, or inert matter other than by a purity analysis and germination test conducted under uniform scientific methods. Any opinion as to the quality or condition of any agricultural seeds is useless unless based on the examination of a truly representative sample. This work is undertaken by the Seed Laboratory of the Department of Agriculture.

Before sending any samples, care should be taken to see that the required particulars are plainly written thereon in ink.

COVERING LETTER.

All samples with *covering letter*, should be addressed to—

The Under Secretary,

Department of Agriculture and Stock,
Brisbane.

SEED MAIZE FOR SALE.*

To growers desirous of obtaining a pure and reliable strain of improved seed, the following varieties are being offered and represent limited stocks raised from selected strains of Departmental seed:—

Yellow.—

Eureka Yellow Dent.
Reid's Yellow Dent.
Funk's Yellow Dent.
Improved Yellow Dent.
Funk's 90-Day.
Golden Beauty.
Star Leaming.

Red—

Red Hogan.

CONDITIONS OF SALE.

Applications for seed, with accompanying remittance (exchange added), should be addressed to the Under Secretary, Department of Agriculture and Stock, Brisbane. Postal address and name of Railway Station should be given.

Advice will be sent when seed is despatched.

Purchasers are requested to write promptly after receipt of seed, should any matters require adjustment.

Should the variety asked for be out of stock, the Department may substitute another variety unless the applicant indicates a desire to the contrary.

PRICES.

To enable applicants living at a distance to benefit, a flat rate of 12s. 6d. per bushel is being charged. This price includes all railage to the nearest railway station, but, where steamer freight is necessary, this and any charges in relation thereto must be paid by the purchaser and the cost thereof added to the remittance.

DESCRIPTION OF VARIETIES.

Eureka Yellow Dent.—Recently imported by the Department of Agriculture, and has given very satisfactory results. It is a fairly short-growing, quick-maturing variety, taking about four months to mature. The ears are situated low on the stalk, are weighty, of medium length, and carry from sixteen to eighteen rows of very tightly packed, amber-coloured, slightly pointed grain, having a rich yellow cap and rough crease dent.

Reid's Yellow Dent.—Moderately tall-growing, medium-early variety—four months. The ears are cylindrical in shape, of good size, carrying from eighteen to twenty tightly packed rows of medium-sized, slightly pointed, wedge-shaped grain, which is of a golden colour, with dark amber base and slightly rough crease dent. The stalks are light and leafy. It is suitable for the production of early crops, or for districts where there is a short growing season. It is also a good fodder corn.

Funk's Yellow Dent.—Medium-early variety of moderately tall growth, taking about four months to mature. The ears are of a good size, and cylindrical in shape, with sixteen to twenty tightly packed rows of grain. The grain is of medium size, with square shoulders, and is thick-bodied, with a characteristic crease dent; is light amber in colour, with a cream-coloured cap. The husk covering is fair. Like Reid's, it is suited for early crops, or districts which have a short growing season. It is a very hardy variety, a good yielder, and also a good fodder corn.

Improved Yellow Dent.—A tall-growing, late-maturing variety—five to five and a-half months. The ears are cylindrical in shape, carrying sixteen to eighteen tightly packed rows. The grain is deep, wedge-shaped, of rich amber colour, with a yellow tip cap and rough crease dent. It is suitable for coastal districts and scrub lands where there is a good rainfall. It is capable of giving heavy yields of grain and fodder. Special strains of this seed have yielded over 100 bushels per acre under field conditions.

Funk's 90-Day.—This is a recent importation of special seed maize, and was propagated by the Department of Agriculture for the purpose of bringing the variety into cultivation, as a high-yielding, reliable type of maize of this description is required to meet the existent demand. As the name implies, it is a very early-maturing variety. The ears are cylindrical in shape, with fourteen to sixteen very

* All previous lists are cancelled.

closely packed rows of grain. The grain is plump, of good depth, and slightly pointed; it has an amber-coloured base, with a rich yellow cap and crease dent.

Golden Beauty.—This variety is a tall-growing, medium-late variety—four and a-half to five months. The ears are long, with very small core, and usually twelve rows of grain. The husk covering is good. The grain is flat, of medium depth, with slightly rounded shoulders; bright amber in colour, with cream-coloured cap and long crease dent. It has a very high shelling percentage, is a very hardy variety, and a splendid yielder. It is also a good fodder corn.

Star Leaming.—This is a fairly short-growing, medium-early variety, taking about four months to mature. Ears carry from sixteen to twenty rows of grain, are borne fairly low on the stem, and are weighty and very compact. The grain is of medium size and blunt-wedge shape; bright amber in colour, with a distinct yellow cap and a rough crease dent. It is one of the best of the early varieties; is very suitable for early or catch crops, a heavy yielder, and a very popular variety.

Red Hogan.—This variety is a fairly tall-growing, late-maturing variety—five to five and a-half months. The ears are large, with usually sixteen rows of well-packed grain. The husk covering is good. The grain is very deep, wedge-shaped, from reddish yellow to light red in colour, with a distinct yellow cap and a rough crease dent. It is a favourite high-yielding variety, well adapted for rich alluvial soils, and suitable for districts with a good rainfall.

HORTICULTURAL NOTES.

By E. W. BICK, Curator, Botanic Gardens.

Some very seasonable weather has been experienced recently. The cold nights have had an appreciably good effect on insect pests, by keeping them within bounds. They are not nearly so prevalent as in what may be termed a very mild winter similar to that experienced last year. The showers of the past few weeks have also been beneficial. The moisture at this time of year, being slow of evaporation, lasts much longer than in summer, and encourages good winter growth. Cinerarias are better than usual, and will require feeding with liquid manure or fertiliser to obtain the best results. Keep them moving, and keep a keen lookout for insect pests such as caterpillars and aphids. Both these attack the plants from the under-side of leaves, where only a few are grown. A rubber or tin puff "ball" is a good thing to use in their extermination. Fill it with insecticide powder or powdered tobacco dust—the old-fashioned snuff does capitally—and blow it over the under-side of leaves; or a strong tobacco-water spray may be used with good effect.

Rose planting should be finished as soon as possible. Keep the newly-planted ones moist, and don't allow the soil around plants to become dry and caked. The surface should be kept broken up. This is a good time to put in cuttings of shrubs such as hibiscus, acalyphas, lagerstroemias, as well as frangipani, and towards the end of the month poinsettias and bougainvillea cuttings may be put in, when the plants go out of flower. Choose good strong well-ripened wood for cuttings, placing them well in the ground. At least two-thirds of the cutting should be in the soil. A fine effect may be obtained with the brick-red *Bougainvillea laterita*, or the pink one (*B. rosea*). When grown as hedges they can be kept trimmed, and with proper attention they will flower profusely. Should any tree-planting be contemplated, get them in as soon as possible, and remember that they will well repay good preparation of soil. Do not plant in a little pot-hole barely large enough to get the plant in as it comes out of the pot, but break up the ground thoroughly, and don't forget that many of the native trees, such as crow's ash, flame tree, wheel of fire, *Barklya syringifolia*, and silver wattle are far better than many of those trees often planted. Get away from the camphor laurel habit, and plant something useful as well as ornamental in small gardens.

Bourvardias were often seen in gardens some years ago, but their cultivation has apparently lapsed somewhat. They are beautiful flowers, and well worth a little trouble. They delight in a rich, free, well-drained soil and a rather sheltered situation, where they would not get much of the afternoon sun, for preference. They are very free-flowering and may be obtained in about a dozen varieties of white and pink, both single and double flowers, and are particularly suitable for small gardens.

A start may now be made with the sowing of seeds of summer flowering annuals, such as aster, amaranthus, celosias, calliopsis, coreopsis, cleanthus, petunias, nicotiana, sunflowers, and zinnias.

RIPENING BANANAS IN AIR-TIGHT CHAMBERS.

The following information was recently supplied by Mr. A. H. Benson, Director of Fruit Culture, to inquiries received by him on this subject:—"The chambers used for ripening bananas in Brisbane are usually about 6 feet by 6 feet by 6 feet, and are made of the best quality tongued and grooved inch pine. They are usually fitted inside with two shelves, so that three tiers of bananas can be treated at once—namely, one on the floor and one on each shelf. A chamber of this size will hold from 100 to 130 bunches according to size. The heat is obtained from a gas-ring or an oil stove. The temperature is raised to about 85 degs. Fahr. This will take about six hours, but the exact time depends on the temperature of the fruit and on that of the outside air. Once the fruit has been raised to 85 degs. the period of ripening can be regulated so that if desirable the fruit can be brought out quicker or delayed according to the raising or lowering of the temperature.

"No heat is used during the summer months, the fruit is simply stacked in an air-tight chamber."

GRAPE CULTURE IN QUEENSLAND.

By ALBERT H. BENSON, M.R.A.C., Director of Fruit Culture.

PART III.

PRUNING THE VINE.

Pruning is one of the most important vineyard operations, and one that requires not only a thorough knowledge of the different habits of growth of the many varieties of grapes but also the possession of considerable mechanical skill or dexterity in the actual performance of the work itself.

The work of pruning is best done by means of a pair of secateurs and a suitable pruning-saw. The former should be strongly made and possess a well tempered cutting blade that can be kept very sharp and that is capable of cleanly severing wood up to 1 inch in diameter. Anything larger will require a saw. Pruning is necessary, in the first place, to shape the vines so that the vineyard can be worked to the best advantage; and, in the second place, in order to provide an annual supply of new fruiting wood. The wood on which the fruit is borne is produced from wood of the previous season's growth, which in its turn was produced from still older wood; so that it will be seen that there must be wood of at least three different season's growth on the vine before it will bear fruit. In starting a vineyard, therefore, the first pruning is that required to shape the vine so that it can be given the form it is to permanently assume, no matter whether it is to be grown as a bush or on a trellis. All vines are started in a similar manner, their subsequent treatment depending on the form they are to permanently assume, and on the particular type of pruning to which they are best adapted. When a vine is grown from a cutting, as previously described, it is allowed to make all the growth it can during the first year, and is not interfered with in any way. The cuttings will not, however, all make the same amount of growth. In some the growth may be several feet in length, whereas in others it may only be an inch or two; but no matter how strong or weak the growth is it must all be cut away at the first winter pruning except one cane, which is cut back to not more than two buds, from which the following season's growth will be produced.

The following illustrations, which have been taken from the first edition of Wickson's "Californian Fruits" and redrawn by the Department's artist, will enable a beginner to see exactly how to prune a one-year-old vine. Fig. 1, represents a good growth; figs. 2 and 3, a medium growth; and fig. 4 a poor growth.

In these figures, *d* represents the top of the original cutting which was planted with two buds above the surface of the ground; *a* is the lowest shoot of each cutting, and in Figs. 1, 2, and 3 it should be cut back to two buds and all other shoots removed. In Fig. 4, shoot *b* is removed and shoot *a* allowed to remain as it is, and should be cut back the next season.

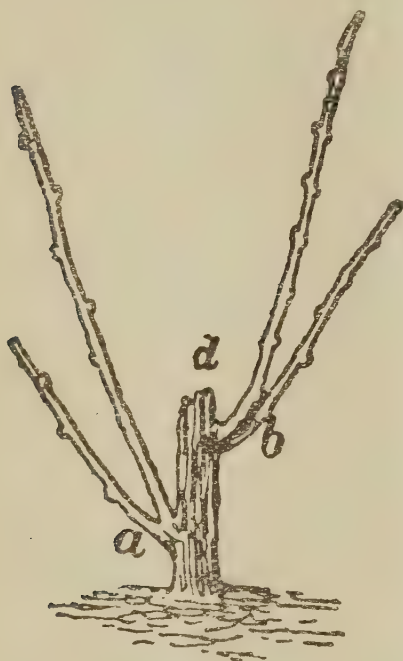


FIG. 1.

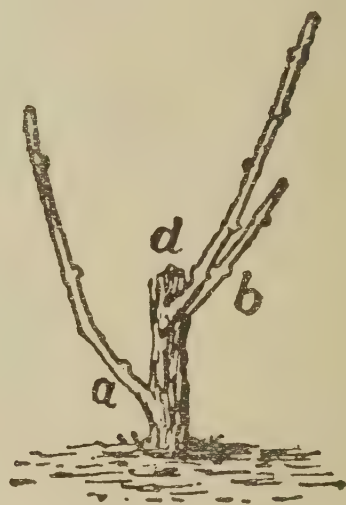


FIG. 2.



FIG. 3.



FIG. 4.

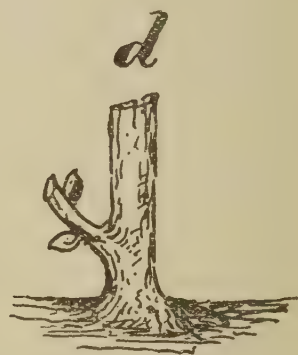


FIG. 5.

Fig. 5 shows the vine in Figs. 1, 2, and 3 when pruned (first winter pruning). From this stage the future treatment of the vine depends on whether it is to be grown as a bush or on a trellis.

In the case of the first, the vine as pruned in Fig. 5 should throw out three or more strong canes during the second season, and in order to keep these canes from spreading all over the ground they should be tied to a strong stake that has been provided for this purpose.

This stake should be not less than 2 in. square, and about 5½ ft long. It should be set at least 1 ft. in the soil, and should be made of durable hardwood. In the western districts, where white ants are troublesome, it should be made of cypress pine.

The vine should be allowed to make all the wood it can during its second season's growth, and the following winter it should consist of

two or three main canes with more or less lateral growth. Fig. 6 shows a growth of three shoots without laterals, and of these the best and straightest *a* is to be retained to form the future trunk of the vine, and *b* and *c* are to be cut clean away.

The cane *a* is then cut back (second winter pruning) to the height at which it is desired to form the head of the vine, which in the case of raisin grapes grown in a hot and dry district should not be more than 8 in. to 10 in. from the ground. In other cases the height should be from 12 in. to 18 in. from the ground, measured from the second bud from the top—not from the top bud—as the second bud fixes the height of the trunk.



FIG. 6.



FIG. 7.

Fig. 7 shows the vine when pruned. In order to produce a clean trunk, free from scars, all the buds other than the three top ones should be rubbed out, and these three buds will throw out strong fruit-bearing canes.

A low-headed vine, such as that met with in the raisin vineyards of California, is not staked; and, excepting in our driest and hottest districts, this method of training is unsuited to our climate, as we never know what rain we are going to get during the ripening period. Consequently bush pruning, in which the young canes are tied to a permanent stake, is to be preferred, as the wood and fruit is kept off the ground and is thus less likely to be injured by rain.

The three strongest canes produced from the three top buds of the vine, as shown in Fig. 7, are allowed to grow till they are 2 ft. or a little more in length, when the tip is pinched back in order to develop lateral growth that will tend to shade the fruit. The three main canes are tied to the stake in order to keep them in place.

At the third winter pruning, the vines will have made a growth somewhat similar to that shown in Fig. 8, and all the growth except two

or three strong main canes is cut away, and these main canes are cut back to two eyes. Fig. 9 (third winter pruning) shows a vine pruned back to two canes, on which two eyes have been left in each, but in the case of a strong-growing vine three canes cut to two eyes each could be left. The vine when pruned shows the height of the permanent trunk, and the pruning from this on is a simple matter. All that is necessary is to take care that the vine is not allowed to carry more canes than it is able to support, and which are capable of producing good bunches of fruit. The exact number of canes to be left will depend entirely on the strength and vigour of the individual vine, and is a matter that must be left to the discretion of the vigneron. Generally speaking, if a vine is found to be making a poor growth the number of canes is reduced, and when the growth is excessive more canes are allowed to remain.



FIG. 8.



FIG. 9.



FIG. 10.

In bush-pruned vines there is frequently a tendency to allow the head of the vine to become very straggling, and to possess a number of arms more or less covered with the scars of previous years' prunings, and the bearing-wood of which is a considerable distance from the main trunk. This is a serious fault, as the straggling arms are always a serious source of danger to the health of the vine, as they tend to form a shelter for the spores of the various fungi by which the grape vine is attacked, as well as a harbour for many insects and their eggs. In

addition, the nearer the bearing-wood is to the main trunk of the vine the better the fruit, consequently it is necessary, both for the sake of the health of the vine and also for the production of first-class fruit, to see that the head of the vine is kept as compact as possible. This is done by always cutting back to the cane nearest to the main trunk and shortening back the new growth every year as far as possible. In addition to this, when the growth cannot be reduced otherwise, a shoot should be allowed to develop from or near to the original head of the vine, and this shoot should when cut back the following season produce a cane to take the place of the straggling arm, which is to be cut clean away. By using care the head of the vine can be kept within reasonable limits and old wood that has outlived its usefulness can be removed and replaced by new and more vigorous growths.

As some vines do not fruit well when short-pruned—that is, when only two eyes are left—it is necessary in their case to somewhat modify this method of pruning when the vine is grown as a bush, and this is done by leaving two or more canes of the previous season's growth from 2 to 3 ft. long, as well as an equal number of canes pruned to two eyes to produce canes on which to grow the fruit the following season. This is known as the rod and spur system of pruning, in which the fruiting cane is cut away once it has borne fruit and a new cane that has been grown from a spur takes its place, only to be replaced in its turn. This system of pruning is used both in the case of vines grown as a bush and also when they are grown on a trellis, and will be described more fully when dealing with trellised vines.

Figure 10, which is reproduced from Mr. C. Ross's pamphlet, gives a good idea of a well-grown and properly pruned bush vine in full bearing.

TRELLISED VINES.

As the pruning of trellised vines is well described and illustrated in Mr. Ross's work, to which I have previously referred, I am reproducing a considerable portion of his pamphlet that deals with this matter, as I agree with him that the unilateral cordon or long rod with spurs or "Royat" is not only the simplest method of trellising vines, but is the one that is best adapted to our local conditions. It consists of one long permanent rod, which can either be spur-pruned by cutting back the canes annually to two eyes, or it can be pruned so that long fruiting canes and short spurs are left (Casanave cordon).

The first season's growth from the cutting is pruned as in Fig. 5, and should eventually produce a growth similar to Fig. 11. By judicious pinching and stopping of laterals and other shoots not required, one long strong cane will be produced by the end of summer (Fig. 11 at A). At the subsequent winter pruning all the side shoots are cut clean off, leaving only the one rod. The vines being planted 7 ft. apart, this cane should be pruned back to a little short of that length and tied down to the bottom wire of the trellis with a graceful curve. (See Fig. 12.) The bottom wire should be about 18 inches from the ground. The following winter this cane becomes a permanent rod with canes (see Fig. 13); each of these canes is then pruned to two eyes, as in Fig. 14. All spring and summer shoots arising from the neck of the vines and underside of the rod must be rigorously suppressed. The curves in Figs. 13 and 14 are too sharp and have caused the strong growth at B, which should have been rubbed off on its first appearance.

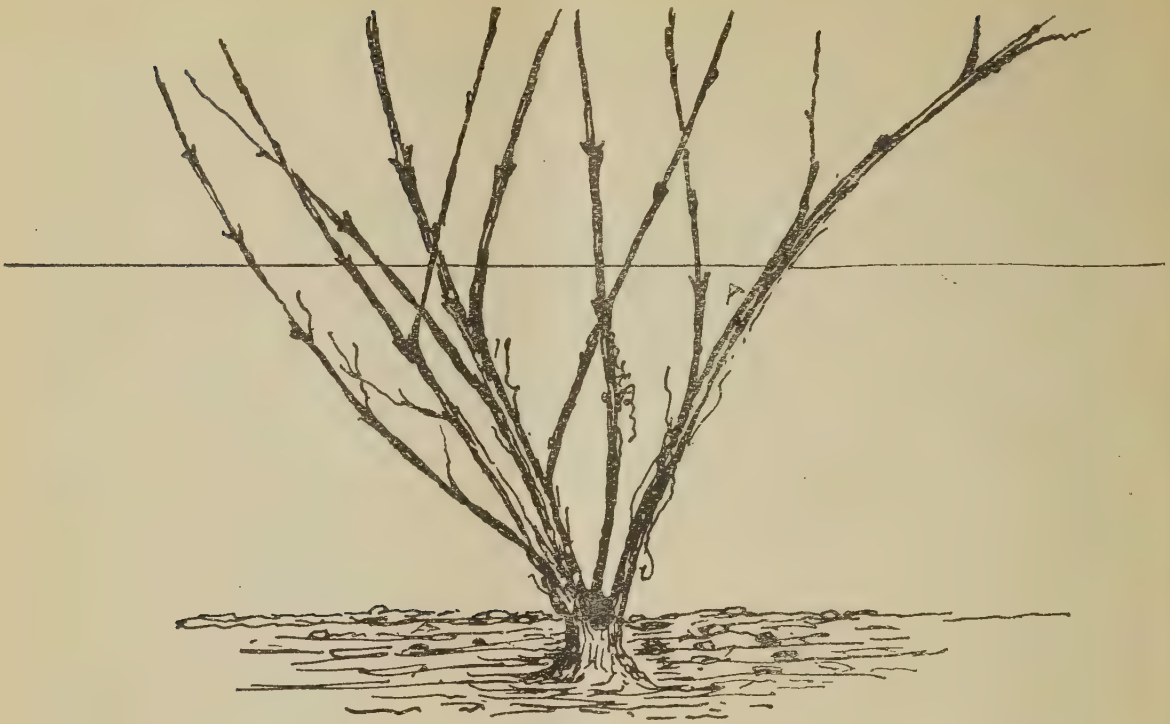


FIG. 11.

The first spur on the rod should not be less than 12 inches from a vertical line of the base (Fig. 12). At the succeeding pruning it will be

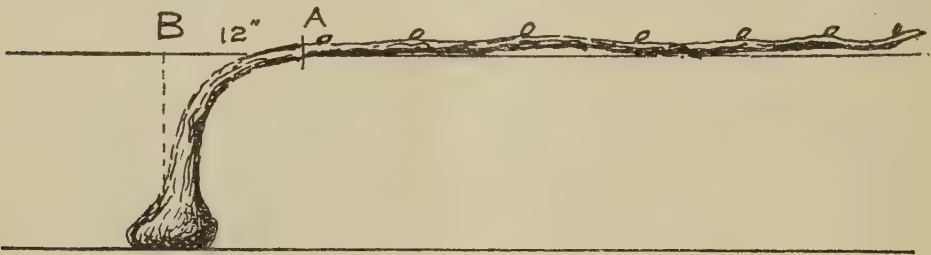


FIG. 12:

found that most of the spurs will have put forth two canes (Fig. 15); the top cane should be cut out close to the lower one, and the remaining cane pruned to two eyes (Fig. 16). Should only one cane have issued from a node, it must be pruned to two eyes. The last spur on the rod is treated differently. Of the two canes issuing therefrom, the upper one is pruned to several eyes and tied down to meet the first spur of the next vine (Fig. 16). This is called the annual terminal fruit branch, with return spur beneath, and acts as a safety valve to the superfluous sap flow, as well as a protection to the neck of the adjoining vine. The lower cane is pruned to two eyes, forming a return spur, and will furnish two canes for the following season, to be treated in the same manner. The terminal fruit branch is only an annual expedient, which is pruned off at each winter pruning and is again reproduced from the upper cane of the return spur left for the purpose.

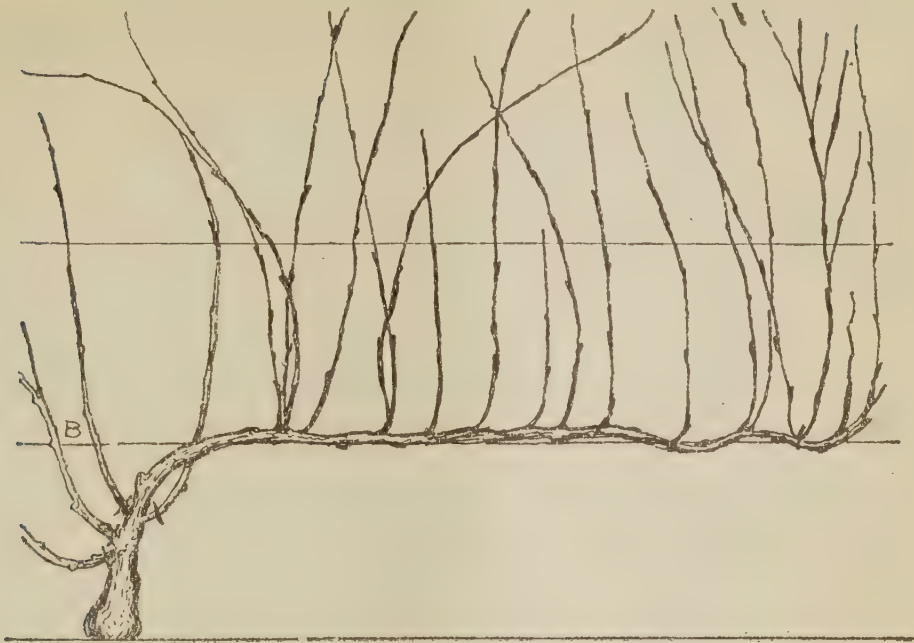


FIG. 13.

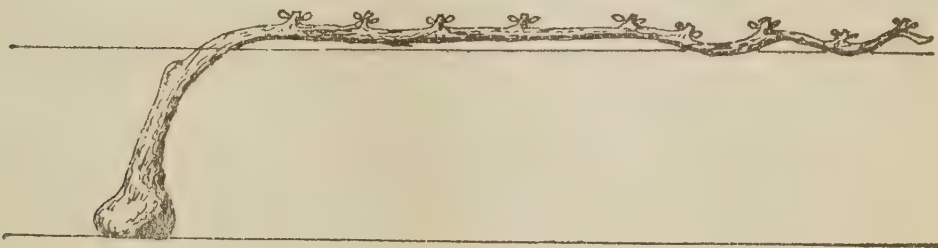


FIG. 14.

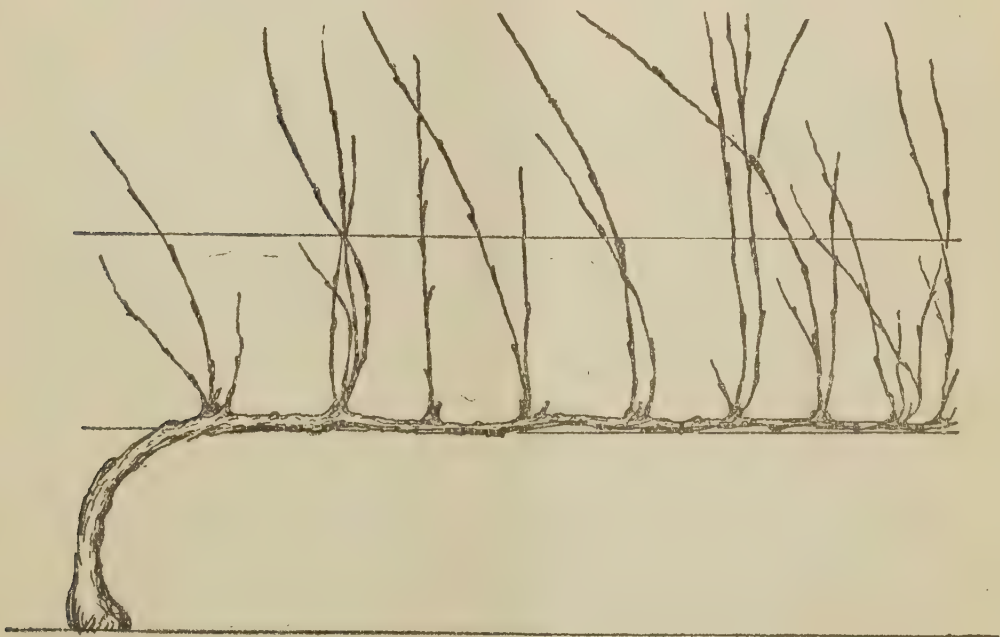


FIG. 15.

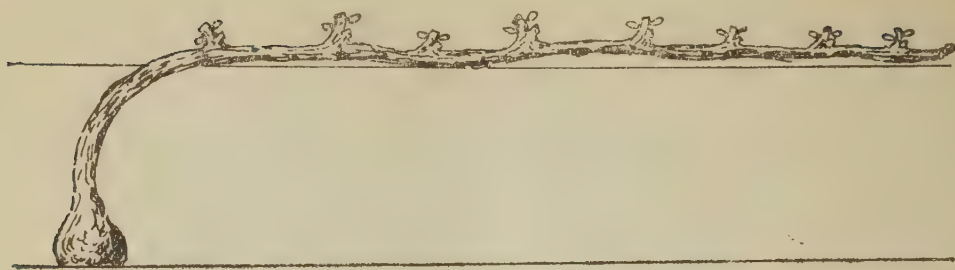


FIG. 16.

THOMERY SPALIER OR BI-LATERAL CORDON.

This is a two-armed vine, and is formed as follows:—

An upright shoot arising from a young vine in spring is pinched back before approaching the bottom wire. Several laterals will eventually push forth; the top one is allowed to grow, whilst others beneath may be pinched back at their first leaf. The lower laterals are not required except for the purpose of elaborating sap to strengthen the main stem. The following winter the cane that has been allowed to grow is pruned back to two eyes.

Several shoots may issue from this point during the following spring, and two of these should be selected and trained along the wire, one on each side, as main arms or permanent rods. Other shoots are rubbed out. At the next pruning the rods are shortened to meet those of the neighbouring vine. The canes issuing from the nodes of these two rods are pruned to two eyes as in the Royat system.

LONG PRUNING.

THE BORDELAISE SPALIER.

This is an excellent system for strong growing vines.

Select a young vine which has been pruned to two spurs. The following spring several canes will issue from these two spurs. At the subsequent pruning the upper cane, or the one situated furthest from the base of each spur, is then bent down to the wire and shortened to six, eight, ten, or more eyes, and the return spurs nearer the base are pruned to two eyes. The return spurs may produce fruit, but their chief function is to provide canes and spurs to replace the annual fruit canes already tied down, and which are completely cut out after producing their one crop. As will be observed, the object of this method is to provide new fruit rods and spurs for every year's crop.

THE CASANAVE CORDON.

The vine is pruned as a unilateral cordon. After the permanent rod has been laid down, short pruning is followed until it arrives at the stage shown in Fig. 15. The upper cane at each spur is now shortened and tied down, and the return spur pruned to two eyes. Where only one cane occurs, it should be pruned to two eyes.

THE DAIRY HERD, QUEENSLAND AGRICULTURAL COLLEGE, GATTON.

MILKING RECORDS OF COWS FOR JUNE, 1922.

Name of Cow.	Breed.	Date of Calving.	Total Milk.	Test.	Commercial Butter.	Remarks.
			lb.	%	lb.	
Hedges Nattie ...	Friesian ...	20 May, 1922	900	4.0	42.00	
Prim ...	" ...	6 Feb., "	1,110	3.2	41.40	
College Cold Iron	Jersey ...	25 Jan., "	600	5.8	41.10	
Gay Lassie ...	Ayrshire ...	20 Feb., "	660	5.0	39	
Miss Fearless ...	" ...	30 May, "	780	3.5	31.80	
Little Buttercup...	Friesian ...	12 Dec., 1921	750	3.6	31.50	
College Prima Donna	" ...	17 Nov., "	630	4.3	31.50	
Dawn of Warragaburra	Jersey ...	17 May, 1922	540	4.9	31.20	
Snowflake ...	Shorthorn...	20 Feb., "	600	4.1	28.80	
Skylark ...	Ayrshire ...	7 Feb., "	540	4.5	28.50	
College Ma Petite	Jersey ...	5 Feb., 1922	450	5.0	28.40	
Auntie's Lass ...	Ayrshire ...	31 Oct., 1921	510	4.6	27.60	
Rosine ...	" ...	18 May, 1922	540	4.3	27.00	
Magnet's Leda ...	Jersey ...	8 Feb., "	450	5.1	27.00	
Dear Lassie ...	Ayrshire ...	19 June, "	504	4.4	25.92	
College Evening Glow	Jersey ...	11 Oct., 1921	360	6.0	25.50	
Confidante...	Ayrshire ...	8 May, 1922	450	4.7	24.60	
Miss Betty ...	Jersey ...	17 May, "	420	4.9	24.30	
College Nita ...	Friesian ...	26 Feb., "	540	3.8	24.00	
College Cobalt ...	Jersey ...	3 April, "	420	4.8	23.70	
College Promise ...	" ...	6 Jan., "	390	5.0	22.80	
College Wildflower	" ...	10 Dec., 1921	390	5.0	22.80	
Lute ...	Ayrshire ...	8 Jan., 1922	540	3.6	22.50	
Sheila of Nundorah	Guernsey ...	16 April, "	390	4.9	22.50	
Lady Mitchell ...	Friesian ...	20 Dec., 1921	450	4.1	21.50	
College Bluebell ...	Jersey ...	22 Oct., "	360	5.1	21.60	
College Grandeur	" ...	22 May, 1922	320	5.7	21.20	
Lilia ...	Ayrshire ...	3 Mar., "	360	4.9	20.70	
Buttercup ...	Shorthorn...	28 Oct., 1921	480	3.6	20.10	

Rainfall for the period, 103 points.

THE MYSTERY OF "ROARING RAILS."

On many of the railway systems of the world the phenomenon of "roaring rails" has been a too-familiar trouble to engineers. The surface of the rails developed ridges at regular distances of an inch or so, and these corrugations led to excessive noise and vibrations. On electric tramway systems the same trouble appeared in ever greater degree; frequently the noise was so excessive that the rails had to be ground flat at great expense—only to reveal fresh corrugations as soon as the traffic was resumed. All sorts of explanations were offered and for a long time the precise cause of the trouble remained a mystery. Now the problem has been settled by a series of experiments carried out by a committee of British experts on a tramway subway in London, where the rails and track could be altered freely so as to test the various explanations put forward. The conclusion reached is that vibration has nothing to do with the case, and that the real cause lies in the action of a very heavily loaded wheel running along the rail. This action makes the material of the rail surface "flow" into waves or corrugations very much as an ordinary road surface flows into waves under the action of a steam roller. The remedy therefore lies in the use of harder rails and, where possible, of larger wheels.—"Industrial Publicity Service," London.

TABLE OF CANE VALUES.

Under 1922 Cane Prices Boards Awards. Calculated to the nearest $\frac{1}{4}$ d. When raw sugar is £30 6s. 8d. per ton; base price £2 2s. for 12 c.c.s. On receipt of c.c.s. returns from the mill, farmers will, by a glance at this table, be able to see exactly the value of their cane per ton with sugar at £30 6s. 8d. for 94 n.t.

c.c.s.	£ s. d.	c.c.s.	£ s. d.	c.c.s.	£ s. d.	c.c.s.	£ s. d.
7.0	0 15 3	10.0	1 12 6	13.0	2 6 9	16.0	3 1 0
.05	0 15 6 $\frac{1}{2}$	.05	1 12 8 $\frac{3}{4}$	.05	2 6 11 $\frac{3}{4}$	.05	3 1 2 $\frac{3}{4}$
.1	0 15 10	.1	1 12 11 $\frac{3}{4}$	.1	2 7 2 $\frac{3}{4}$	.1	3 1 5 $\frac{1}{2}$
.15	0 16 1 $\frac{1}{4}$	.15	1 13 2 $\frac{1}{2}$	.15	2 7 5 $\frac{1}{2}$	.15	3 1 8 $\frac{1}{2}$
.2	0 16 4 $\frac{3}{4}$	.2	1 13 5 $\frac{1}{2}$	.2	2 7 8 $\frac{1}{2}$	.2	3 1 11 $\frac{1}{2}$
.25	0 16 8 $\frac{1}{4}$	.25	1 13 8 $\frac{1}{2}$	.25	2 7 11 $\frac{1}{4}$	.25	3 2 2 $\frac{1}{4}$
.3	0 16 11 $\frac{3}{4}$	.3	1 13 11	.3	2 8 2	.3	3 2 5
.35	0 17 3 $\frac{1}{2}$	.35	1 14 2	.35	2 8 5	.35	3 2 8
.4	0 17 6 $\frac{1}{2}$	.4	1 14 4 $\frac{3}{4}$	.4	2 8 7 $\frac{3}{4}$	.4	3 2 10 $\frac{3}{4}$
.45	0 17 10	.45	1 14 7 $\frac{3}{4}$	.45	2 8 10 $\frac{3}{4}$	.45	3 3 1 $\frac{3}{4}$
.5	0 18 1 $\frac{1}{2}$	.5	1 14 10 $\frac{1}{2}$	.5	2 9 1 $\frac{1}{2}$	.5	3 3 4 $\frac{1}{2}$
.55	0 18 5	.55	1 15 1 $\frac{1}{4}$	.55	2 9 1 $\frac{1}{4}$	.55	3 3 7 $\frac{1}{4}$
.6	0 18 8 $\frac{1}{2}$	.6	1 15 4 $\frac{1}{4}$	.6	2 9 7 $\frac{1}{4}$	.6	3 3 10 $\frac{1}{4}$
.65	0 18 11 $\frac{3}{4}$	.65	1 15 7	.65	2 9 10	.65	3 4 1
.7	0 19 3 $\frac{1}{4}$	.7	1 15 10	.7	2 10 1	.7	3 4 4
.75	0 19 6 $\frac{3}{4}$	.75	1 16 0 $\frac{3}{4}$	.75	2 10 3 $\frac{3}{4}$	.75	3 4 6 $\frac{3}{4}$
.8	0 19 10 $\frac{1}{4}$	.8	1 16 3 $\frac{1}{2}$	.8	2 10 6 $\frac{1}{2}$	.8	3 4 9 $\frac{1}{2}$
.85	1 0 1 $\frac{3}{4}$	.85	1 16 6 $\frac{1}{2}$	.85	2 10 9 $\frac{1}{2}$	.85	3 5 0 $\frac{1}{2}$
.9	1 0 5	.9	1 16 9 $\frac{1}{4}$	.9	2 11 0 $\frac{1}{4}$	.9	3 5 3 $\frac{1}{4}$
.95	1 0 8 $\frac{1}{2}$	.95	1 17 0 $\frac{1}{4}$	.95	2 11 3 $\frac{1}{4}$	.95	3 5 6 $\frac{1}{4}$
8.0	1 1 0	11.0	1 17 3	14.0	2 11 6	17.0	3 5 9
.05	1 1 3 $\frac{1}{2}$	.05	1 17 5 $\frac{3}{4}$	.05	2 11 8 $\frac{3}{4}$	.05	3 5 11 $\frac{3}{4}$
.1	1 1 7	.1	1 17 8 $\frac{3}{4}$	.1	2 11 11 $\frac{3}{4}$	.1	3 6 2 $\frac{3}{4}$
.15	1 1 10 $\frac{1}{4}$	.15	1 17 11 $\frac{1}{2}$	.15	2 12 2 $\frac{1}{2}$	.15	3 6 5 $\frac{1}{2}$
.2	1 2 1 $\frac{1}{2}$	.2	1 18 2 $\frac{1}{2}$	.2	2 12 5 $\frac{1}{2}$	.2	3 6 8 $\frac{1}{2}$
.25	1 2 5 $\frac{1}{4}$	.25	1 18 5 $\frac{1}{4}$	.25	2 12 8 $\frac{1}{4}$	.25	3 6 11 $\frac{1}{4}$
.3	1 2 8 $\frac{1}{4}$	.3	1 18 8	.3	2 12 11	.3	3 7 2
.35	1 3 0 $\frac{1}{4}$	.35	1 18 11	.35	2 13 2	.35	3 7 5
.4	1 3 3 $\frac{1}{2}$	.4	1 19 1 $\frac{3}{4}$	.4	2 13 4 $\frac{3}{4}$	.4	3 7 7 $\frac{3}{4}$
.45	1 3 7	.45	1 19 4 $\frac{3}{4}$	.45	2 13 7 $\frac{3}{4}$	.45	3 7 10 $\frac{3}{4}$
.5	1 3 10 $\frac{1}{2}$	.5	1 19 7 $\frac{1}{2}$	.5	2 13 10 $\frac{1}{2}$	.5	3 8 1 $\frac{1}{2}$
.55	1 4 2	.55	1 19 10 $\frac{1}{4}$	.55	2 14 1 $\frac{1}{4}$	.55	3 8 4 $\frac{1}{4}$
.6	1 4 5 $\frac{1}{2}$	.6	2 0 1 $\frac{1}{4}$	.6	2 14 4 $\frac{1}{4}$	.6	3 8 7 $\frac{1}{4}$
.65	1 4 8 $\frac{3}{4}$	.65	2 0 4	.65	2 14 7	.65	3 8 10
.7	1 5 0 $\frac{1}{4}$	.7	2 0 7	.7	2 14 10	.7	3 9 1
.75	1 5 3 $\frac{3}{4}$	.75	2 0 9 $\frac{3}{4}$	.75	2 15 0 $\frac{3}{4}$	.75	3 9 3 $\frac{3}{4}$
.8	1 5 7 $\frac{1}{4}$	.8	2 1 0 $\frac{1}{2}$	.8	2 15 3 $\frac{1}{2}$	.8	3 9 6 $\frac{1}{2}$
.85	1 5 10 $\frac{3}{4}$	.85	2 1 3 $\frac{1}{2}$	.85	2 15 6 $\frac{1}{2}$	.85	3 9 9 $\frac{1}{2}$
.9	1 6 2	.9	2 1 6 $\frac{1}{4}$	.9	2 15 9 $\frac{1}{4}$	.9	3 10 9 $\frac{1}{4}$
.95	1 6 5 $\frac{1}{2}$	.95	2 1 9 $\frac{1}{4}$	.95	2 16 0 $\frac{1}{4}$	.95	3 10 3 $\frac{1}{4}$
9.0	1 6 9	12.0	2 2 0	15.0	2 16 3	18.0	3 10 6
.05	1 7 0 $\frac{1}{2}$	.05	2 2 2 $\frac{3}{4}$	.05	2 16 5 $\frac{3}{4}$	.05	3 10 8 $\frac{3}{4}$
.1	1 7 4	.1	2 2 5 $\frac{3}{4}$	.1	2 16 8 $\frac{3}{4}$	.1	3 10 11 $\frac{3}{4}$
.15	1 7 7 $\frac{1}{2}$	.15	2 2 8 $\frac{1}{4}$	.15	2 16 11 $\frac{1}{2}$	.15	3 11 2 $\frac{1}{2}$
.2	1 7 10 $\frac{3}{4}$	.2	2 2 11 $\frac{1}{2}$	.2	2 17 2 $\frac{1}{2}$	.2	3 11 5 $\frac{1}{2}$
.25	1 8 2 $\frac{1}{4}$	.25	2 3 2 $\frac{1}{4}$	.25	2 17 5 $\frac{1}{4}$	.25	3 11 8 $\frac{1}{4}$
.3	1 8 5 $\frac{3}{4}$	.3	2 3 5	.3	2 17 8	.3	3 11 11
.35	1 8 9 $\frac{1}{4}$	.35	2 3 8	.35	2 17 11	.35	3 12 2
.4	1 9 0 $\frac{1}{2}$	.4	2 3 10 $\frac{3}{4}$	.4	2 18 1 $\frac{3}{4}$	.4	3 12 4 $\frac{3}{4}$
.45	1 9 4	.45	2 4 1 $\frac{3}{4}$	.45	2 18 4 $\frac{3}{4}$	.45	3 12 7 $\frac{3}{4}$
.5	1 9 7 $\frac{1}{2}$	.5	2 4 4 $\frac{1}{2}$	.5	2 18 7 $\frac{1}{2}$	.5	3 12 10 $\frac{1}{2}$
.55	1 9 11	.55	2 4 7 $\frac{1}{4}$	.55	2 18 10 $\frac{1}{4}$	.55	3 13 1 $\frac{1}{4}$
.6	1 10 2 $\frac{1}{2}$	.6	2 4 10 $\frac{1}{4}$	.6	2 19 1 $\frac{1}{4}$	.6	3 13 4 $\frac{1}{4}$
.65	1 10 3 $\frac{3}{4}$	.65	2 5 1	.65	2 19 4	.65	3 13 7
.7	1 10 9 $\frac{1}{4}$	.7	2 5 4	.7	2 19 7	.7	3 13 10
.75	1 11 0 $\frac{3}{4}$	.75	2 5 6 $\frac{3}{4}$	.75	2 19 9 $\frac{3}{4}$	.75	3 14 0 $\frac{3}{4}$
.8	1 11 4 $\frac{1}{4}$	.8	2 5 9 $\frac{1}{2}$	.8	3 0 0 $\frac{1}{2}$	.8	3 14 3 $\frac{1}{2}$
.85	1 11 7 $\frac{3}{4}$	.85	2 6 0 $\frac{1}{2}$	.85	3 0 3 $\frac{1}{2}$	.85	3 14 6 $\frac{1}{2}$
.9	1 11 11	.9	2 6 3 $\frac{1}{4}$	.9	3 0 6 $\frac{1}{4}$	.9	3 14 9 $\frac{1}{4}$
.95	1 12 2 $\frac{1}{2}$	.95	2 6 6 $\frac{1}{4}$	.95	3 0 9 $\frac{1}{4}$	.95	3 15 0 $\frac{1}{4}$
10.0	1 12 0	13.0	2 6 9	16.0	3 1 0	19.0	3 15 3

Editorial Notes.

New Agricultural Legislation.

The third session of the Twenty-second Queensland Parliament may well be regarded as a distinctly agricultural assembly. The measures foreshadowed in the Opening Speech of His Excellency the Governor (the Right Hon. Sir Matthew Nathan) are of much moment to the man on the land. The general tenor of the legislation proposed is in the direction of building up a higher and more complete rural civilisation. The programme includes such important measures as the Producers' Organisation Bill (now set down for the third reading), Fruit Cases Act Amendment Bill, Co-operative Agricultural Production Act Amendment Bill, State Advances Act Amendment Bill, a Bill to deal with the Dawson Valley Irrigation and Water Conservation Scheme, Agricultural Education Bill, Discharged Soldier Settlement Act Amendment Bill, Closer Settlement Act Amendment Bill, and a Forestry Bill.

* * * * *

Primary Producers' Organisation Bill.

"It is recognised now that Agriculture, the mother of all wealth, is one of the most important industries, requiring not only a greater amount of energy, but a greater intelligence than any other calling." This dictum of the Minister for Agriculture (Hon. W. N. Gillies) in the course of his second-reading speech on the Primary Producers' Organisation Bill indicates the underlying principles of that important measure. The Bill, which has now reached the third reading stage, provides for the establishment of the Queensland Producers' Association, incorporates the Council of Agriculture and District Councils, and generally gives statutory sanction and power to the scheme for the complete organisation of the agricultural industry in Queensland. A full survey of its provisions will be published in the September Journal.

* * * * *

Agricultural Education Bill.

Another measure of far-reaching importance to the agricultural industry has been introduced by the Minister for Education (Hon. John Huxham) in the form of a Bill to make better provision for agricultural education. No scheme for rural organisation would be complete without some provision for the extension of agricultural education. Current statistics set out in bold relief the national value of primary production. All our new wealth is derived from the soil. Agriculture calls for trained intelligence the same as any other vocation that demands an application of a combination of science and art. The Bill provides for the appointment of a board, upon which the Queensland University and agricultural educationists will be represented, and its purpose is to open up a new furrow in the field of agricultural knowledge for the benefit of children attending the State and rural schools. The board will have complete control of agricultural schools and agricultural classes.

* * * * *

A Bill to Amend the Fruit Cases Act.

"The Bill is to give effect to the wishes of the fruitgrowers to make regulations for packing, grading, and standardisation of fruit." By this remark, in the course of his introduction of the measure, the Minister for Agriculture (Hon. W. N. Gillies) set out its object. The Bill is one of two clauses, and provides that no person shall (a) pack any fruit or vegetables intended for sale unless such fruit or vegetables is or are graded as prescribed by regulation; or (b) sell any fruit or vegetables in a package if such fruit or vegetables is not or are not graded as prescribed by regulation; or (c) sell the whole or any part of any lot of fruit or vegetables unless such lot of fruit or vegetables is stacked as prescribed by regulation; (d) sell any lot of fruit or vegetables if such fruit or vegetables is not or are not graded as prescribed by regulation.

Event and Comment.

Federal Guarantee for Cotton.

The Federal Government is taking a live interest in the development of the cotton-growing industry. The Commonwealth Cabinet has given consideration to the question of guaranteeing next season's cotton crop on the basis of £1 for £1 with the State Governments, on the understanding that the Empire Cotton Growing Association will co-operate. The amount of the guarantee, in detail, in connection with the Federal advance has not yet been decided. The Minister for Agriculture (Hon. W. N. Gillies) advises that the State Government guarantee has been extended to 31st July, 1923. The question of a further extension is now receiving Cabinet consideration.

Sugar Exhibits at the Brisbane Show.

The Australian Sugar Producers' Association intends to stage a comprehensive sugar exhibit at the forthcoming Show of the Royal National Association, opening at Brisbane on 7th August. A special feature will be a continuous band or frieze running along the top of the panels, containing, in large and clear texts, various facts and figures concerning the industry, so that he who strolls casually through the court may read and learn as he goes. The centre of the space will be filled by exhibits from the mills and refineries, showing the different processes of manufacture, and by industries allied to, or dependent on, sugar. An interesting feature will be a small hand crushing mill, by means of which there can be demonstrated to the public the actual analysis of juice from the sugar cane. A chemist will be in charge of this section, and short lectures will be given to visitors. The Royal National Association, evidently, and quite fittingly, intends to make exhibits of Queensland's most important agricultural industry one of the leading features of this year's Show.

Beerburum Fruit—Returned Soldiers' Success.

A very fine collection of well-grown Beerburum products, including pineapples, papaws, Seville oranges, passion fruit, and Lisbon lemons, was exhibited in the Office of the Minister for Lands recently. Commenting on the display, the Minister (Hon. J. Harry Coyne) remarked that the exhibit supplied effective evidence of the suitability of the land within the limits of the Beerburum Soldiers' Settlement for profitable fruit production. The papaws were unusually large, and the pineapples weighed up to 7½ lb. each. One fine sample came from the farm of Mr. J. McG. Walker—an ex-service man 60 years of age. Mr. Walker also sent a number of large, clean-skinned Seville oranges, taken from 2-year-old trees. The pines displayed would go from nine to twelve to the case. The Beerburum pine crop this year is expected to average about fifteen per case. Ordinarily a case holds about twenty. The Minister was particularly pleased with the excellence of the passion fruit exhibits, and regarded them as further disproof of the assertion that this fruit cannot be grown at Beerburum. The whole display was indicative not only of the adaptability of the Soldiers' Settlement to fruit production but also of careful and correct cultivation.

The Bee-eater.

At a recent meeting of the Brisbane District Crows and Flying Foxes' Destruction Board, two members of the Queensland Beekeepers' Association, Messrs. Butler and Jones, addressed the assembly on the habits of the Bee-eater, or Rainbow Bird (*Meropsonatus*). Mr. Butler said that the birds would wait in trees near the hives, and when the bees flew past would dive at them and eat them. It was a severe trial for the beekeeper. Mr. W. F. Lyon, a notable beekeeper, had said that the bee-eater was a serious drawback to the industry. Mr. Jones said that he had had forty years' experience with bees, and he quoted a case where the contents of the stomach of one of these birds revealed four bees. He had never shot one of these bee-eaters without finding the sting of bees in the stomach. Mostly the bird kept a short way from the hives, but in wet weather, when the bees did not venture far out, the birds went right to the apiary. The question as to whether the bird should continue to receive protection was discussed. Mr. A. H. Chisholm (State secretary of the Ornithologists' Union) spoke, by invitation. He said that the naturalists were not blind to the man on the land. The bee-eater's stronghold was Queensland, and was not so bad in the other States. The board decided to recommend that this bird should be removed from the protected list.

New Markets for Meat.

As the outcome of special inquiry, the belief is gaining ground that Australia will find an easement in the meat situation by cultivating a demand for her pastoral products in the populous countries in the North. They may be shipped either as frozen meat, boneless beef, tinned meats, or even to the nearer countries on the hoof, but it is felt that, in one form or another, there are big markets awaiting development practically at our door. Much information has been collected by the Graziers' Association, and this will facilitate final recommendations and decisions. Opinions as to the practicability of the proposal vary considerably, but, generally, the outlook is regarded as hopeful.

Already a fair beef trade exists between the North and North-west of Australia and Java, and this business is expanding. As Java has a population of 40,000,000 the possibilities there may not be overlooked. Japan is also a possible big customer. Already one shipment of 100 tons of frozen beef has been despatched to Japan to fill an army order, and the prospect of extending business to the civilian population seems fairly hopeful.

"The Chinese are a nation of meat-eaters, their purchases being limited only by their purses," is the remark of a Federal Government representative in a recent report. The meat hungriness of the Chinese Labour Corps was proverbial in France during the war, and was no little cause for anxiety to those who controlled the commissariat, particularly at rail-head dumps where Chinese were employed. China should provide ample room for an extension of the meat trade. Already the United States and Canada are fairly large shippers of meat to Shanghai and Hong Kong, and they are selling beef there at practically the same price at which it can be landed from Queensland to-day. America is evidently looking well ahead and is prepared to sacrifice present profits for future prospects, and Australia, apparently, must be prepared to do the same if our Northern markets are to be extended and permanently established.

Defrosting Meat.

The Rayson-Cooper meat defrosting process has so impressed graziers that an effort is being made to secure Commonwealth control of it in the interests of the meat industry of Australia, and to this end the aid of the Queensland Government has been invoked. In the course of a recent statement on the subject the Premier (Hon. E. G. Theodore) expressed appreciation of the value of the representations made to him by the United Graziers' Association, and stated that, acting on their suggestion, he had communicated with the Federal Government on the matter. The Premier also referred to a report which he had received from the Agent-General (Hon. J. A. Fihelly) dealing with a demonstration, at which a representative of the Queensland Government was present, of the process in London. The demonstration was carried out at the British and Argentine Company's stores, West Smithfield. Veterinary experts were in attendance from the Australian and New Zealand High Commissioners' offices; also a representative of the Queensland Meat Export Company. The conditions observed were:—

- (1) The meat was inspected and weighed before being placed in the defrosting chamber;
- (2) The chamber was sealed after the meat was deposited;
- (3) After removal from the defrosting chamber the meat was weighed under the observation of experts;
- (4) The meat was held for a few days and joints were cut;
- (5) Meat similar to that placed in the defrosting chamber was thawed out in the atmosphere and afterwards compared with that defrosted by the process.

The test was commenced on 20th March last, the meat used being Q.M.E. and Argentine beef and New Zealand and Argentine mutton and lamb. All the meat was carefully weighed at the time of removal, and the weights were compared.

It is set out that the mutton and lamb increased in weight, and there was a slight loss in the weights of some of the beef. All the meat was pronounced by experts to be thoroughly thawed and free from dripping, even when cut. On final examination from three to five days after removal from the chamber it was found to be sound and free from taint. It is stated by the promoters that the beef treated by the process had been sent to the shops of the British and Argentine Company and sold as chilled meat.

The Raw Cotton Situation.

"Cotton," the official journal of the Manchester Cotton Association, commenting on the raw cotton situation, early in June, remarks that the new crop continues to attract considerable attention, and there have been issued quite a number of forecasts of the condition of the crop, the principal one being that of the United States Government, which figured the condition of the crop on 25th May at 69.6, compared with 66.0 twelve months ago, and a ten-year average of 74.6. The National Ginners' estimate was 72.1. Reports indicated the invariable backwardness of the crop, which must make it more susceptible to boll weevil damage and later frost. In spite of these poor crop accounts, it is well to remember that the cotton plant has wonderful recuperative powers, and it is not unusual for the cotton crop to be proclaimed a disaster many times during the season. The Journal goes on to comment further:—

"Nothing fresh has developed in regard to the acreage prospects, and the average expectation, it is thought, would be for an increase of 10 per cent, for the belt as a whole. This would mean an area of a little over 35,000,000 acres on the revised estimate of last season, on which an average yield of 178 lb. lint to the acre would mean a crop of 13,000,000 bales, exclusive of linters. With a favourable growing season, better results may be realised, particularly as all reports indicate an abundant supply of labour for proper cultivation. In West Texas and around the rim of the belt from Texas to the Atlantic coast, the increase in acreage is said to be heavy.

"Trade reports continue encouraging, and consumers of raw cotton are displaying greater interest in the staple. This is no doubt due to their becoming more fully convinced regarding the seriousness of the supply position during the next year owing to the poor accounts of the new crop. Flooded lands have not yet been replanted and probably will not be. Recent weather has been propitious for the spread of the boll weevil, which is becoming increasingly active.

"The trade outlook fosters the belief that the mills will require an appreciably larger supply than the present season; thus a crop of even 13,000,000 bales would prove inadequate.

"It is believed that during the next year America will take at least 750,000 bales more, Great Britain 1,000,000 bales, and the Continent 750,000, in all 2,500,000 bales above the present year's figures of, say, 12,500,000, giving a total prospective consumption of 15,000,000 bales. This may be somewhat of an exaggeration, but there is no reason to doubt that the Continent will take an increasing quantity, and Great Britain, with improving trade, which country's imports are 1,500,000 bales behind this time last year, should take fully 1,000,000 bales more. As the surplus to be carried over at the end of this season is likely to be little above 4,000,000, consumers are realising more and more how precarious the supply position will become."

The Brisbane Show : Departmental Court.

As in former years one of the outstanding features of the Brisbane Show will be the Court of the Department of Agriculture and Stock. A special Cotton Trophy will illustrate every phase of the cotton industry. Other striking features will be exhibits of cereal types, propagation plots, indigenous grasses, sugar-cane, and wool. The work of the Entomological Division and Stock Institute will be well represented. The State Cannery will also stage an effective exhibit of its manufactured products. The colour scheme this year will be in grey and cream relieved with maroon. The trophy designs, plan, and general lay out of the Court are the work of Mr. H. W. Mobsby, F.R.S.A., the departmental photographer and artist.

Australian Fruit in England.

According to cable advices from London (25th July), Messrs. Freeman and Company, selling agents for the Commonwealth Fruit Pool, report that the market for canned fruits both Australian and Californian is very stagnant, owing to wet and unseasonable weather. Choice Australian pears realised up to 18s. 6d. per dozen, peaches to 14s. 9d. If the weather improves, the Australian fruit should do well, as the new Californian pack is a month later than usual. Pears will not arrive until early in October.

The "Grocers' Gazette" congratulates Australian packers on the immense improvement in their production and describes the fruit as of good quality, evenly graded, attractively labelled, and extremely well turned out.

A shipment of Australian oranges, brought by the Moreton Bay, including Queensland mandarins, turned out excellently.

American Prices—Staple Cottons.

An examination of recent American files shows that cotton prices are firm, with an upward tendency traceable to improved statistical situation and to modification of views relative to probable acreage. At the same time, in West Texas, and around the rim of the belt from Texas to the Atlantic coast, the increase in acreage is heavy, due to the idea that boll weevils will cause cotton prices to go much higher, while these sections are relatively free from weevils.

The menace of the flood in the Mississippi River, in so far as the delta below Memphis and the alluvial lands in Arkansas are concerned, is a thing of the past. The effect upon acreage, it is believed, will be slight, although production may be affected to some extent, for the reason that in many instances less fertile lands were substituted in the planting for the lands intended for cotton that were under water.

A View of the American Cotton Crop Outlook.

The "Textile World," of New York, states:—

"Several domestic cotton crops that were killed speculatively during May and June revived sufficiently later in the season to produce some of the largest yields the country has ever seen. A bulge in cotton prices, such as has been experienced in the last two weeks, may carry no conviction to spinners and distributors, and may actually discourage buying of the raw material and its products (as has been the case), but it is an opportune stimulant for growers. A 20 to 21 cent basis for middling upland cotton is sufficiently high to encourage growers to exert themselves to the utmost to get maximum production from the acreage planted and replanted.

"No irretrievable damage has been done by floods in the lower Mississippi valley or by heavy rains in Texas and Oklahoma. Comparatively little cotton land has been flooded, and the heavy precipitation in Texas and Oklahoma is likely to prove a blessing later on. Over the remainder of the cotton belt the weather has been generally favourable thus far. As to what it may be during the balance of the season one man's guess is as good as another's, but the important factor is that a sufficient acreage has been planted to give us one of the largest crops on record, and present prices are high enough to stimulate maximum effort and care in the cultivation of the growing crop.

"Adverse weather conditions are more to be feared by growers this season than is the boll weevil. In previous seasons growers in certain parts of the cotton belt have had reason to believe that they might escape the ravages of the boll weevil, but this year every grower started the season with the knowledge that he could not expect to make a crop unless every precaution was taken to fight this pest. By careful cleaning of the land before planting, by the planting of early maturing varieties of cotton, by the increased use of fertilisers, by careful cultivation, and by the utilisation of chemical and other methods of destroying the insect and its larvæ, this season's cotton crop will be the first general demonstration of the grower's ability to check the ravages of this pest. It is confidently to be expected that real progress will be shown, and that the percentage of the crop lost from this cause will be considerably less than it was last season.

"There is another phase of the recent radical advance in cotton prices that we would like to overlook, because of the discouraging effect that its exploitation might have upon growers, but it must be recognised sooner or later. We refer to the fact that maintenance of current cotton prices must result in a marked restriction of consumption. Even when cotton was selling well below 18 cents demand for cotton manufactures from Asia, Africa, and other so-called cheap markets remained considerably below pre-war volume. Every cent of advance above an 18 or 20 cent basis for middling uplands must involve a further marked restriction in demand from countries of low purchasing power, including the impoverished countries of Europe. It is true that, at current prices, cotton is not selling much above the average basis of commodity prices, which in foreign markets are about 65 per cent. above the pre-war average; yet, to insure anything like maximum pre-war consumption, cotton must be available well below the average commodity level, and that means a maximum of about 18 cents. At that price fair profits for both growers and spinners would be possible, and probably a 12,000,000-bale American crop might be absorbed.

"The fair conclusion to be drawn from these apparently conflicting statements is that spinners cannot hope to operate their machinery at anywhere near maximum capacity unless they can produce goods at prices that can be paid by the inhabitants of countries of low purchasing power, and such prices are not possible unless growers are able to provide an adequate supply of cotton at proportional prices. It means hard work and narrow profits for growers, spinners, and their employees, until such time as world prosperity and buying power are more nearly normal."

Boll Weevil and Overflows.

In reply to an inquiry regarding the effects of floods on the boll weevil, W. D. Hunter, of the United States Government Bureau of Entomology, writes a Southern planter as follows:—

“We have never found a case where extensive overflows have reduced the weevil to the extent that the crop has been greatly benefited. It is true that some weevils are always killed by overflows, but there are survivors in the trees and on the high lands immediately surrounding the overflowed areas. When these areas are replanted the crop is late; in fact, so late that the weevils left are able to overtake the production of fruit.”

Next Year's Cotton Consumption.

A correspondent, writing in “Commerce and Finance,” New York, states:—

“No matter how large the crop may prove to be, basing calculations on experience, we believe consumption will be far in excess of production.

“When we analyse supply, we consider both the visible and invisible items. With demand, we are prone to pay attention only to the visible, or momentarily tangible aspects of demand. At present we are likely to be swayed too much by slack inquiry for raw material and goods. We overlook factors of far more compelling import—depleted shelves, low inventories among industrial users of cotton fabrics, scanty wardrobes among the fairly well-to-do, and the rags and tatters to which millions of the world's population have been reduced in the last few years. This is the source of the invisible demand. The need is there, urgent and desperate in many cases, requiring only an increment in buying power to render it astonishingly effective. That it will become thus effective, only those who fail to read the signs of the times will doubt.

“While we make no positive prediction, we believe the basis has been laid for a consumption of American cotton for the season of 1922-23 of fully 15,000,000 bales if that supply can be obtained, and unless prices rise practically to a prohibitive point.

“Consumption of American cotton for the year ending 31st July, 1922, we believe will be approximately 12,500,000 bales. In view of the fact that the textile industry of the United States this season has been recovering from depression, with operations retarded by strikes and curtailment, and in view of the indicated improvement in general business, we expect American mills in the season beginning 1st August, 1922, to increase their consumption by at least 750,000 bales.

“We expect British consumption of American cotton to increase by a minimum of 1,000,000 bales. Lancashire, through its recent wage reductions, has placed itself on a competitive basis. Great Britain is not going to permit the extinction of her great textile industry. This season's statistics furnish no guide to the future. According to the ‘Financial Chronicle,’ exports to Great Britain up to the close of last week were only 1,297,000 bales. This compares with 2,824,000 bales for the corresponding date in 1920. They indicate total exports of less than 1,800,000 bales. The amazing significance of these figures may be appreciated when we find that we have to go back to 1874, nearly half a century, to find British imports on approximately the same scale. The United Kingdom took more than 2,000,000 bales as far back as 1858. We therefore consider the estimate of 1,000,000 bales increase extremely conservative.

“The continent in our opinion, will increase by fully 750,000 bales of American cotton. Italy, according to our advices, is preparing to increase at the rate of 20,000 bales per month. Germany, Poland, and Czecho-Slovakia will be working on a much larger scale. France has by no means reached her limit. The figures on Japan and China we leave unchanged. Any deficit from this quarter is likely to be made up by additions for other countries.

“This makes a total addition of 2,500,000 bales to the probable consumption of 12,500,000 bales this season, or a prospective absorption of 15,000,000 bales. According to the Census Bureau, the total carry-over of American cotton in all positions throughout the world last season was 9,172,000 bales. The crop of last season was about 7,800,000 bales, making an aggregate of 16,972,000. This season's consumption of 12,500,000 bales would reduce the total surplus to less than 4,500,000 bales. A crop of 12,000,000 bales for the new season would give a total supply for 1922-23 of about 16,500,000 bales to meet an indicated demand for 15,000,000 bales. This would be nearer to famine than the cotton world has been since Civil War days. If the crop should be less than 12,000,000, the effect of the resultant stringency would be indescribable.”

Recapitulation of Cotton Exports from the United States for 100 Years.

The subjoined table indicates a century's progress, decade by decade, and the enormous value of the cotton industry to the United States. Incidentally the figures open out a new vista of agricultural development and possibilities in Queensland.

Decade.	Bales.	Tons.	Value.
			\$
1821-1830 ..	4,071,687 ..	1,017,923 ..	256,632,567
1831-1840 ..	8,634,662 ..	2,158,667 ..	528,789,702
1841-1850 ..	13,989,587 ..	3,497,398 ..	553,427,062
1851-1860 ..	23,601,577 ..	5,900,395 ..	1,146,092,778
1861-1870 ..	8,089,101 ..	2,022,258 ..	1,083,373,097
1871-1880 ..	28,420,585 ..	7,105,148 ..	1,945,673,249
1881-1890 ..	42,642,888 ..	10,660,721 ..	2,206,812,580
1891-1900 ..	60,837,298 ..	15,209,327 ..	2,256,455,584
1901-1910 ..	74,733,416 ..	18,683,356 ..	3,859,233,593
1911-1920 ..	76,190,467 ..	19,017,620 ..	6,512,761,108
Grand total ..	341,211,268 ..	85,212,816 ..	20,349,251,320

RAINFALL IN THE AGRICULTURAL DISTRICTS.

TABLE SHOWING THE AVERAGE RAINFALL FOR THE MONTH OF JUNE IN THE AGRICULTURAL DISTRICTS, TOGETHER WITH TOTAL RAINFALLS DURING JUNE 1922, AND 1921, FOR COMPARISON.

Divisions and Stations.	AVERAGE RAINFALL.		TOTAL RAINFALL.		Divisions and Stations.	AVERAGE RAINFALL.		TOTAL RAINFALL.	
	June.	No. of Years' Records.	June, 1922.	June, 1921.		June.	No. of Years' Records.	June, 1922.	June, 1921.
<i>North Coast.</i>	In.		In.	In.	<i>South Coast—continued:</i>	In.		In.	In.
Atherton	1'59	21	1'31	2'95	Nambour	3'42	26	2'02	8'59
Cairns	2'86	40	2'71	8'12	Nanango	2'05	40	1'47	7'68
Cardwell	2'07	50	1'50	2'77	Rockhampton ...	2'07	35	1'82	7'07
Cooktown	2'04	46	1'48	4'13	Woodford	2'67	35	2'23	8'36
Herberton	1'01	35	0'91	2'68					
Ingham	2'46	30	1'75	4'94	<i>Darling Downs.</i>				
Innisfail	7'04	41	9'37	10'25	Dalby	1'68	52	2'55	5'57
Mossman	2'39	14	1'58	6'41	Emu Vale	1'44	26	1'55	4'75
Townsville	1'27	51	0'19	0'58	Jimbour	1'71	34	2'45	7'03
					Miles	1'92	37	2'04	4'28
<i>Central Coast.</i>					Stanthorpe	1'89	49	1'49	5'81
Ayr	1'30	35	0'73	0'36	Toowoomba	2'37	50	1'64	6'56
Bowen	1'61	51	0'50	0'69	Warwick	1'80	57	2'08	5'54
Charters Towers ...	1'33	40	0'30	0'33					
Mackay	2'71	51	1'34	2'93	<i>Maranoa.</i>				
Proserpine	3'49	19	1'26	6'18	Roma	1'68	48	3'27	3'80
St. Lawrence	2'46	51	1'46	2'90					
					<i>State Farms, &c.</i>				
<i>South Coast.</i>					Bungeworgorai ...	1'67	8	2'58	3'76
Biggenden	1'86	23	2'38	3'93	Gatton College ...	1'75	23	1'03	6'08
Bandaberg	2'72	39	1'57	4'48	Gindie	1'55	23	1'10	3'97
Brisbane	2'64	71	1'83	7'98	Hermitage	1'96	16	2'10	5'17
Childers	2'20	27	2'33	3'86	Kairi	1'25	8	Nil	4'45
Crohamhurst	4'09	30	1'81	11'05	Sugar Experiment Station, Mackay	2'37	25	0'91	3'00
Esk	2'06	35	1'24	6'29	Warren	1'90	8	Nil	7'17
Gayndah	1'87	51	1'36	6'56					
Gympie	2'51	52	3'13	5'57					
Glasshouse M'tains	4'10	14	1'66	11'15					
Kilkivan	2'07	43	1'28	9'03					
Maryborough	2'81	51	2'30	3'89					

NOTE.—The averages have been compiled from official data during the periods indicated; but the totals for June this year, and for the same period of 1921, having been compiled from telegraphic reports, are subject to revision.

GEORGE E. BOND,
State Meteorologist.

Production, Prospects, and Prices.

The following market survey is an abridgement of departmental summaries of conditions, prospects, and prices for the monthly period ended 28th July, 1922:—

Agriculture.

General rain at intervals in the course of the period was most opportune, and altered completely the whole outlook, more particularly as concerns wheat. Seasonal conditions prevailed and sharp frosts were recorded in most areas. Winter crops are well forward, but the season is too far advanced to permit of some fodder classes (particularly root crops) benefiting by the altered conditions. A continuance of normal factors will mean, probably, an excess of the 1922 wheat crop over last year's harvest.

Cotton is receiving marked attention in every agricultural area, and the 1922-23 crop promises to be a record since the revival of cotton culture within this State.

Arrowroot production for milling purposes has been influenced adversely by last year's slump in prices.

Preparation for potato-planting are well forward in localities where early planting is usually practised, but continued low temperatures may influence growers who usually prefer July planting in deferring operations.

Towards the end of the term wheatgrowing prospects improved greatly and in many localities there was a sufficiency of sub-surface moisture to carry cereals on to the advanced stages of growth.

Lucerne Chaff.—As the term advanced supplies increased and prices receded; 9s. 6d. for prime was the top and 4s. for inferior was the minimum for the month.

Oaten Chaff.—4s. 4d. to 9s. 6d. was the month's range. Supplies were moderate and trans-border consignments light.

Mixed Chaff.—5s. 6d. to 8s. 4d. were the extremes for the month. Supplies and demand moderate.

Maize.—Prime grain values to 4s. 4½d. early in the term. The following week showed a slight advance, prime bringing 4s. 5½d. In the third week quantities increased and sales were made at from 4s. 2d. to 4s. 6½d. Last week grain was plentiful, demand fair; sales to 4s. 8½d. Other lines held 4s. 5d. to 4s. 7½d.

Potatoes.—Sales were effected at 4s. to 7s. early in the month. Light to moderate quantities came to hand later and business was done at 4s. to 7s. 11d. Some lines were held at 4s. to 8s. 6d. In the third week clearances were made at from 4s. to 7s. 9d.; new realised 9s. Last week demand eased; sales from 5s. to 8s.

Sweet Potatoes.—Supplies moderate early in the period—4s. 6d. to 5s. 6d. Second week, light supplies—3s. to 4s. 9d. These conditions continued up to last week when sales were made at 2s. 6d. to 5s. 1d.

Pumpkins.—Last week supplies were fair; sales from 4s. to 5s.

Broom Millet.—At the end of the month sales were made at from £50 to £60 per ton.

Fat Stock.

Review of fat stock market during the week ended 28th July:—

Cattle.—980 yarded, mostly bullocks, from fair to prime. The market opened very firm, with values higher than preceding week's figures. Prime from 22s. to 25s. per 100 lb. Later, values eased. Prime bullock beef averaged 22s. 6d., medium and good trade beef, 20s.; best cows were worth generally from 15s. to 17s.

Sheep.—6,655 offered. Yarding, mixed. Commencement values firm and hardened as market progressed. Demand brisk for all descriptions. Prime mutton, 5d. to 5½d.; medium and good trade mutton realised to 5d., in addition to skin value.

Pigs.—Marburg Sales, 29th July.—230 pigs were yarded, and baconers made 7d. lb. throughout, and were eagerly sought after. Prices paid were:—Backfatters, £4 5s. to £6 2s.; baconers, heavy, £3 10s. to £3 19s. 6d.; medium, 60s. to 69s. 6d.; light, 48s. to 59s. 6d.; porkers, 40s. to 50s.; stores, 15s. to 30s.; slips, 6s. to 12s. 6d.

Fruit and Vegetables.

A system of obtaining absolutely accurate market information is being devised and prices to the grower will, it is hoped, be published in the next Journal and thereafter.

General Notes.

Guarantee to Cotton-growers.

It is said that some prospective cotton-growers are hesitating, not feeling certain about the duration of the time during which the Government guarantee of 5½d. per lb. for the crop will hold good. The Minister for Agriculture (Hon. W. N. Gillies) has stated that it will hold good until 31st July, 1923.

Publication Received.

We have received from the Director of the Dominion Experimental Farms and Stations, Ottawa, Canada, "Seasonable Hints," a very interesting publication, from which we have taken two articles which give good advice to Canadian farmers, and which apply to the man on the land in our own State.

Destroying Ants.

We frequently are asked to give some remedy for the destruction of black ants, and only recently we published several proved remedies. As a present inquirer may not have seen these, let him try the gasoline cure. Pour a half-pint of gasoline into the ant hill or nest of the pests. This will instantly spread through all the nest or hill when it is set on fire; and as the heat on the surface increases, the gas will generate from the utmost recesses, and the fire will cook the ants. The amount of gasoline stated will burn for a long time, and kill every ant in the largest nest as well as all which attempt to enter it from without.

Manufacture of Motor Spirit.

For some time past the Bundaberg Distillery Company has been experimenting with power alcohol as a means of utilising instead of destroying the immense quantities of molasses produced, and which cannot be conserved in the manufacture of rum. Mr. W. R. Hartnell (chairman of directors) has succeeded in manufacturing power alcohol on a commercial scale, and maintains that the product can be marketed to car-owners at 1s. per gallon less than petrol. The spirit, it is stated, can be used in any car without alteration to existing equipment, and on recent trials on cars used in connection with the Prime Minister's visit to Bundaberg gave within 5 per cent. of the mileage obtained by the use of petrol.

Queensland Agricultural College Bursaries.

An examination will be held on the 9th and 10th November next, in Brisbane and elsewhere, according to where the candidates reside, for four bursaries at the Queensland Agricultural College, tenable for three years. Candidates must not be less than 16 or more than 18 years of age on the 1st January, 1923. Candidates failing to obtain a bursary, but who pass this examination, will be considered to have passed the College entrance examination, and may enter the course for the Diploma in Agriculture on payment of the College fees. Nominations close on the 25th October, 1922. Further particulars can be obtained upon application to the Under Secretary, Department of Agriculture and Stock, Brisbane.

The Boll Weevil.

The statement issued by the United States Department of Agriculture referring to boll weevil has attracted considerable attention. A correspondent states that according to this statement an unprecedentedly heavy infestation of weevil is likely this year, and farmers are advised to limit their acreage to areas which can be thoroughly cultivated. It appears that this statement regarding the weevil outlook is based upon the result of tests conducted in the Government experimental station at Tullulah, Louisiana, where the insects are kept under observation during the winter and their condition noted after freezing weather has passed. These tests, it seems, showed that five times as many weevils as usual survived hibernation, but the question is whether tests conducted in this particular locality can be considered representative of the entire belt.

Many cotton men believe that the winter mortality of the insect may have been much greater in more northerly sections, and there has been considerable criticism of the official statement as tending to support propaganda for a restricted area or against any greatly increased acreage.—"Cotton."

Forestry Legislation and Education.

The projected Forestry Bill and the matter of stimulating education and research in forestry were the chief subjects discussed at the last meeting of the Empire Forestry Association, at which His Excellency the Governor, Sir Matthew Nathan, presided.

Consideration of the status of forestry legislation in Queensland, deferred from a previous meeting, was to have been resumed. It was reported, however, that the Minister for Lands, Mr. Coyne, had given an assurance that a Forestry Bill would, in all probability, be introduced during the present session, and that a skeleton draft of the measure would be submitted to the association with the view to practical suggestions being offered.

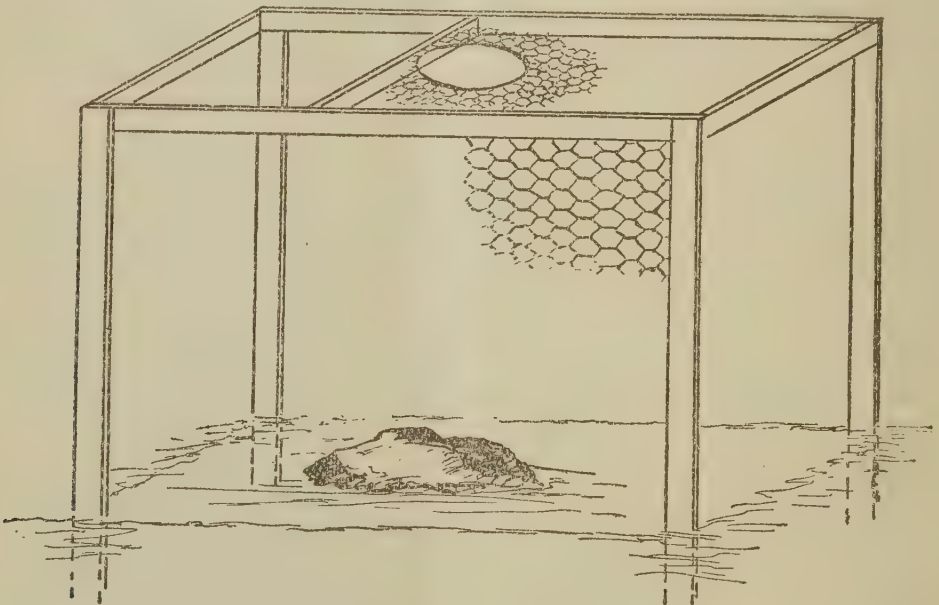
The meeting accordingly turned to the question of education and research which was introduced by Mr. Henry Tryon, chief of the Division of Entomology, Department of Agriculture and Stock. After Mr. Tryon had emphasised the importance of cultivating a knowledge and appreciation of trees among school children and at the University, the following subcommittee was appointed to consider and report upon the subject:—

Messrs. E. H. F. Swain and C. R. Paterson (Forestry Department); Professor Hawken and Dr. Bagster (Queensland University); Messrs. R. A. Wearne and L. C. Morris (Technical College); C. Thompson (Teachers' Training College); Miss F. Bage (secondary school); Messrs. J. C. Stubbin (primary schools); W. J. Doak (Railway Department); F. O. Nixon (Timber Merchants' Association); C. T. White and H. Tryon (Agricultural Department); and Dr. H. I. Jensen (Geological Department).

In the discussion bearing upon the subject special reference was made to the value of Arbor Day in the schools, and Mr. A. E. Kennedy (Under Secretary for Education), assured the meeting of the continued cordial support of his department in this direction.

An Effective Crow Trap.

Mr. W. G. Brown, State Sheep and Wool Expert, supplies the following particulars of an effective crow trap:—One of the best traps for crows I have seen is that figured below.



As will be seen it is a rectangular frame covered with wire netting on top, bottom, and sides. On the top a circular space is left free from netting alongside a cross bar on which the crow alights. The bait, any carrion will do, is laid on the earth below the opening. The crow alights on the bar and drops through the aperture on to the bait. When surfeited, he naturally attempts to fly out, but the spread of his wings effectually prevents his escape. With this trap I have seen as many as twenty crows captured in one day. When one crow is caught he attracts others. The specifications are—Size of framework: 6 feet x 4 feet x 6 feet. The uprights should be let into the ground to a depth of about 1 foot. The aperture should be about 20 inches in diameter.

The Public Curator.

The Public Curator, whose advertisement appears in this paper, makes up wills free of any charge, when a testator or testatrix desires to appoint him trustee and executor. It is noteworthy that he has special powers under his Act, which enable him to provide for the maintenance, education, and general up-bringing of infant beneficiaries; legal advice and assistance are also given free, and all matters dealt with by him are strictly private. All trust funds in his hands belong to the beneficiaries for whom he is trustee and not to the Government, though the Government is behind him to protect the public if he commit a breach of trust. His accounts are under the supervision of the Auditor-General, and he is also directly responsible to the Supreme Court for his trusteeship. The Public Curator will be glad to give information to any one seeking it.

Interstate Fruit Specials.

Fruit trains run on behalf of the Southern Queensland Fruit Growers' Society, Ltd., cleared Wallangarra on Friday and Saturday for the week ended 15th July, carrying 304½ tons, of which 193½ tons were for Melbourne and 111½ tons were for Sydney, consisting of 5,280 cases of bananas, 1,956 cases of pines, 355 cases of citrus, 11 cases of passion fruit, 70 cases of custard apples, 19 cases of papaws, 3 bags of peanuts, and 34 bags of beans. Melbourne took 3,714 cases of bananas, 814 cases of pines, 351 cases of citrus, 4 cases of passion fruit, 1 case of custard apples, 3 cases of papaws, and 3 bags of peanuts. Sydney took 1,566 cases of bananas, 1,142 cases of pines, 16 cases of papaws, 7 cases of passion fruit, 68 cases of custard apples, and 34 bags of beans. District loadings by tonnage were:—Dayboro' line—to Melbourne, 25 tons; North Coast—to Sydney, 51½, to Melbourne, 153; Tweed Heads—to Sydney, 49; Currumbin—to Sydney, 10½, to Melbourne, 15½.

Arsenic as a Cotton Pest Killer.

Thus the "Queensland Government Mining Journal"—

The "Engineering and Mining Journal-Press," of New York, in its issue of 20th May, 1922, gives prominence to the uses of arsenic in the cultivation of cotton, particularly in fighting the cotton boll weevil, a pest which, fortunately, we are not at present troubled with in Queensland. Through Government research calcium arsenate has been found effective, when properly applied, against the boll weevil, and as the encroachment of the boll weevil has encompassed the entire cotton-producing section of the United States at this time, the demand for and use of calcium arsenate will be greatly increased. The basic purpose of the poisoning is to merely keep the weevils sufficiently reduced in number so that their feeding will not increase the fruit shed which would be experienced in their absence; that is to say, the weevils are allowed to develop undisturbed until they approach the point of actually reducing the crop, and are then held in check by poisoning just long enough to let the plant set and develop beyond weevil injury all bolls that it will be able to mature.

If calcium arsenate is properly made it will not injure the cotton plants, nor is it nearly so dangerous as paris green, as it does not possess the caustic characteristics of the latter. When properly applied from 5 to 7 lb. of calcium arsenate are required to an acre for each application, the number of applications usually varying from three to five, with an interval or from four to seven days between applications, depending upon the extent of the infestation and atmospheric conditions. Owing to the cost of the material and applying, the Government states that it seems inadvisable to attempt poisoning of land which is not capable of making at least one-half bale of cotton per acre in the absence of weevil injury. The gain secured by poisoning ranges as high as 1,000 lb. of seed cotton per acre, and on fairly fertile soil, subject to a serious degree of weevil injury, average gains of from 300 to 500 lb. of seed cotton per acre are entirely possible.

There seems to be no method of determining an average amount of arsenic used in the manufacture of calcium arsenate, owing to seasonal demands varying in accordance with agricultural conditions; that is to say, with low prices for cotton, comparatively little boll-weevil poisoning would be undertaken by the planters, whereas with good prices for cotton, and the consequent necessity of saving the crop, there would be a demand for a large amount of calcium arsenate. The quantity of calcium arsenate used per acre will vary from 15 to 25 lb., according to the number of applications required; and, if the use of calcium arsenate became at all general throughout the cotton-producing area, it would afford a market for practically all of the arsenic produced in the United States.

The principal difficulty at the present time is in securing an effective method of application. Calcium arsenate is used in exceedingly fine powdered form, and is applied either by machines treating five rows of cotton at a time, or by means of a hand gun, usually carried by a man on horseback, treating one row at a time.

Answer to Correspondent.

Cockroaches and their Extermination.

V.F.S. (Woombye)—

Mr. Henry Tryon, Entomologist-in-Chief, supplies the following information in answer to your query:—

Houses about Brisbane are subject to infestation to a greater or less extent by different kinds of these pests. In fact, there are about at least six distinct species to be met with in Brisbane tenements alone. Any satisfactory reply to it cannot therefore be given without knowing in the first place which one is at present in any instance of infestation, such as the one at Glen Vale referred to.

This is due to the fact, not only that their habits are different, but rather that what one cockroach will consume individuals of another kind will not touch. This remark in fact especially applies to the small so-called "German cockroach" that will not take baits that contain arsenic (whilst one or more of the larger kinds are very partial to it) or only be made with difficulty to allow this poison to enter into their systems. There are several cockroach proprietary specifics sold by chemists and duggists.

The small cockroach mentioned, and a second cockroach the same size is, however, killed by powdered borax. Further, there is a very useful phosphorus bait, understood to contain sweetened flour paste impregnated with this body, after just dissolving it in carbon bisulphide; but the latter solution, being inflammable, it is preferable to try the mixture already made and placed in special containers. This paste, when employed, is simply thinly spread on pieces of paper or cardboard, that when so treated are placed in the haunts of the cockroaches, whose destruction is aimed at.

In rooms, or houses containing rooms, that can be completely closed against the egress of vapours, the insect may be killed by fumigating with sulphur fumes, pyrethrum (or insectibane) fumes, hydrocyanic acid fumes, and by others of their kinds. Two or three hours submission to their action is generally all that is required. However, a second fumigation is necessary when a few weeks have elapsed since the first was executed to admit of the eggs hatching out, since these bodies themselves can with difficulty be assailed when placed side by side in the peculiar cockroach egg cases.

Cockroaches may again be trapped in large numbers. The traps made for this purpose, however, greatly vary. A simple one is composed of a single wooden box in the cover of which is a round hole into which the neck of a wide mouth bottle just fits. This box is just baited with some food substance to which cockroaches are very partial (sweetened stale beer in the case of one kind of cockroach) and then placed in their haunts as night is coming on.

Note.—I find that amongst cockroach poisons stocked by chemists here are—Paris green, blatticide, scatter, roach, and borax, the merits of all of which are equally extolled.

SHOW DATES 1922 AND 1923.

Show society secretaries are invited to forward for insertion in this list dates of forthcoming shows. Alterations of dates should be notified without delay.

Belmont: 19th August.

Horticultural Society of Queensland.

(Annual): 19th August.

Coorparoo: 26th August.

Kenilworth: 31st August.

Imbil: 13th and 14th September.

Laidley: 13th and 14th September.

Sherwood: 16th September.

Rocklea: 23rd September.

Kilcoy: 28th and 29th September.

Beenleigh: 1st and 2nd September.

Zillmere: 1st and 2nd September.

Gympie: 7th, 8th, and 9th September.

Wynnum: 9th September.

Esk Camp Drafting: 4th and 5th October.

Pomona, 4th and 5th October.

Southport: 6th October.

Enoggera: 7th October.

WARWICK.—Eastern Downs Horticultural and Agricultural Association: 13th, 14th, and 15th February, 1923.

FRUIT FLY INVESTIGATIONS.

[FOURTH PROGRESS REPORT.]

By HUBERT JARVIS, Entomologist in Charge of Fruit Fly Investigations at Stanthorpe.

Early in February of this year Mr. Hubert Jarvis, of the Division of Entomology, Department of Agriculture and Stock, was appointed to investigate the Fruit Fly Problem in the Granite Belt. The first report of his observations and activities was published in the May Journal. The second and third reports appeared in June and July, respectively, and the following report is now made available by the Minister for Agriculture and Stock (Hon. W. N. Gillies).

[LETTER OF TRANSMITTAL.]

Sir,—I have the honour to submit, and at the same time to recommend for publication, the Fourth Progress Report by Mr. H. Jarvis, Entomologist in charge of Fruit Fly Investigations, Stanthorpe, premising that the portion “Seasonal Absence of Fruit Fly,” and dealing with a special investigation into the possible occurrence of the insect in the northern districts of New South Wales, abutting on the Stanthorpe area, has already been made the subject of a separate document, giving more detail, dated 14th July, 1922. It is further to be added, in reference to the section “Cold Storage and Fruit Fly,” that whilst the report emphasises the value of this operation for the purposes set forth, it obviously ventures no opinion on the general adaptability of Stanthorpe fruit for continuous submission to the process, nor on the admissability of the latter as an economic procedure—questions that are not, primarily, entomological ones.

I have, &c.,

HENRY TRYON, Entomologist-in-Chief.

WINTERING OF FRUIT FLY.

Although, possibly, fruit-fly maggots may still be found present in stored fruits, those which have been under observation in the laboratory since 23rd June, 1922 (on Ben Davis apples), have now all perished, presumably owing to very low temperatures experienced during the last few weeks. One specimen of *B. Tryoni* (Queensland Fruit Fly) emerged in this Office on 20th June, 1922, from larvæ collected on 23rd March, 1922, on quinces. This fly, however, was very much crippled, and died soon after emergence.

Adult fruit flies have been kept alive in glass jars in the laboratory for nine weeks. None originally collected are, however, alive to date.

Search has been made in packing-sheds and other suitable situations with a view to the possibility of finding the fruit fly (*B. Tryoni*) hibernating as a mature insect, but no specimens have so far been met with.

Fruit fly pupæ, apparently alive, are still under observation in this Office.

SEASONAL ABSENCE OF FRUIT FLY.

Consequent on reports that abandoned and neglected orchards existed in New South Wales, adjacent to the Queensland border, arrangements were made by the Queensland Agricultural Department to investigate the question, the Department of Agriculture of that State co-operating with it and deputing their Government Entomologist-in-Chief, Mr. W. W. Froggatt, F.L.S., to assist in the undertaking.

Mr. Froggatt accordingly arrived at Stanthorpe on 28th June, 1922, and in his company the following places were visited:—Marylands Station and district, Wylie's Creek, Liston, Undercliff, Wilson's Downfall, Rivertree district, Wallangarra, Tenterfield, and Boonoo Boonoo. In most of the above districts abandoned and neglected orchards were noted, and visits of inspection made (*vide* report, 14th July, 1922). On the first day of inspection the party was accompanied by Mr. W. Ranger, President, Southern Queensland Fruit Growers' Association, and he took a very keen interest in the investigation and in viewing these neglected orchards first hand, so to speak, but owing to his many engagements he was, unfortunately, unable to make one of the party on its inspections subsequently.

The possibility of the existence of the fruit fly (*B. Tryoni*) in the maggot or other stage at the present time of the year, outside the Stanthorpe area and at a

lower altitude, was also made a subject of investigation, and in pursuance of this object a vine scrub, situated on the Warwick road, about 25 to 50 miles from Stanthorpe, was visited, as also was Patterson's Scrub, lying, at a similar distance north of Stanthorpe, in New South Wales.

Both Patterson's Scrub and the vine scrub already mentioned are likely, in season, to produce and harbour native fruits suitable for the local development of fruit-fly maggots; and, negative evidence of such occurrence being alone forthcoming, it is proposed to again visit them during, say, next October.

The close proximity of many of the neglected and abandoned orchards inspected in New South Wales to the Stanthorpe district (in some cases distant not more than 10 miles—e.g., Marylands, Liston, and Wylie's Creek), would, in my opinion, probably result in their proving a source of fruit-fly infestation to the Granite Belt area of Queensland. Fruits such as plum, peach, and apple maturing, as they do in the above districts, somewhat earlier than similar fruits in the Granite Belt, it is quite possible that fruit flies developing from maggots in these fruits over the border might easily find their way (aided, it may be, by favouring winds) into the Stanthorpe area. In order to ascertain if this be the case, it is my intention to carry out experiments in this direction early in the coming season. Large numbers of fruit flies can be bred in the insectary, if then available, and after being suitably marked, can be transferred to varying distances and liberated, the range being extended as results, ascertained by recaptures, dictate.

[Note.—We are indebted to Dr. Spencer Roberts, of Stanthorpe, for bringing to our notice the vine scrub referred to above; and, moreover, for the very material help he afforded us, too, throughout the investigation.]

COLD STORAGE AND FRUIT FLY.

While on leave of absence in Brisbane, a letter was received from Mr. A. H. Paget, The Summit, requesting the examination of a case of apples (variety, Ben Davis) then in cold storage, and which had been already submitted to a temperature of 38 deg. Fahr. for a period of seven weeks. Being at the time unable to attend to the matter myself, Mr. H. Tryon, Government Entomologist and Pathologist, kindly made an examination of them for me, and reported as follows:—

- (1) It was possible to detect in those apples examined that they had been punctured by fruit fly, but these punctures were so inconspicuous not to compel the attention of the ordinary buyer of fruit.

[Note.—Four apples in the top layer of the case exhibited more or less decay. In three of these, case injury had operated, and the remaining one exhibited *bitter rot*.]

- (2) Connected with the punctures were slender tunnelings—sometimes branched, extending inwards from four-tenths to seven-tenths of an inch, rarely to one inch. These were obvious since their walls had become brown (chemical change), and not because they had proved sites of decay, since this decay, which ordinarily happens with fruit-fly attack, was absent. In fact, the injuries remarked had to be looked for rather than being obvious, and were scarcely material.
- (3) No fruit-fly eggs were discoverable, and wherever fly maggots occurred these were quite small, and had evidently not been long hatched.
- (4) Every maggot was found dead and shrunken; the fact of death being very evident owing to the dark colour acquired. Their small size points to very brief duration as living maggots, on once being submitted to cold storage conditions.
- (5) Except those fruit abovementioned as decayed, to a greater extent the fruit had kept all right. As packed, it was sound and marketable.

Mr. Tryon further added—

“This last statement as to condition of fruit is the pronouncement of the Director of Fruit Culture, Mr. A. H. Benson, who concurs with me, and in concluding also that bitter pit was present in several of the apples, may have become more noticeable during the period of storage; and, as consequence of it, others have testified also as to the soundness and lack of evident injury of the apples in question..

"It may be concluded from this examination that apples of the kind represented in the experiment may remain free from fruit-fly attack, almost up to the time that they are ready for being harvested; that fruit-fly maggots (and eggs) present in them can be killed, on their having been gathered, by submission of the apples to cold storage; and that the amount of injury developed be dependent, in any one apple variety, on the time elapsing between gathering and submission to this process."

The foregoing statement, testifying as it does to the efficacy of cold storage conditions in destroying the eggs and young maggots of the fruit fly before material damage has been effected, and also to the consequent soundness and marketable quality of the fruit subjected to them, should undoubtedly prove of very great value to all who are interested in this important question.

SUPPOSED FRUIT-FLY MAGGOTS.

Maggots about half grown and bearing a rather close general resemblance to those of the fruit fly (*B. Tryoni*) were recently submitted to this Office by Mr. B. Wilson, of Cotton Vale. These maggots had been discovered in cow dung under the following circumstances:—Large quantities of maggot-infested apples had been, it was stated, fed to the cattle yielding this excrement, and this saved, with intention, presumably, of examination for indication of the possible presence of living fruit-fly larvæ or pupæ therein. On being examined in this Office the maggots in question proved to be those of one of our common muscid flies (Fam. *Anthomyidæ*) and not, as was supposed, the maggot of the Queensland Fruit Fly (*B. Tryoni*).

Another instance of maggots similarly mistaken for those of the fruit fly was supplied by specimens tendered by Mr. D. Taggart, of The Summit. These maggots were found in rotting apples that had been missed in the harvesting and were lying under the orchard trees; these apples, moreover, had been subjected to a good many very severe frosts, but in spite of this the maggots which they contained were still alive and active. The situation in which the insects were found, and their general colour and size, led, as might be naturally expected, to their being mistaken for fruit-fly maggots. On examination, however, they proved to be the interesting maggot form of one of the large family of flies known as the *Syrphidæ*. Certain species of flies of this group breed only in vegetable matter reduced to a semi-liquid or liquid state through decay, and so are not responsible for any injury to fruit or vegetables. Other syrphid flies, again, are in many instances the good friends of the orchardist, feeding, as certain species do, on aphides or plant lice.

RED MITE.

Red Mite (*Bryobia* sp.) is in the egg stage very noticeable in many orchards at the present time. Trees harbouring their eggs look as if they had been painted with bands of pink and light-red colour. A portion of this encrusting matter, on being examined with a lense, will be seen to be composed of large quantities of minute ova. These eggs (about $\frac{1}{4}$ mm. in diameter) are laid adjacent to one another, on the trunk and lower branches of the tree, any wrinkles in the bark being generally filled with them. Not only are they thus laid on the bark of the tree, but also on and within the ground at the base of it, and so, on turning over the small lumps of soil here, hundreds of these eggs will be seen covering the under surfaces and packed away in every crevice between and within them.

Although not credited with doing very much harm, it is extremely probable that, should these mites multiply unchecked, their attacks would have a very injurious effect on the host tree. The usual winter spraying, practised by most orchardists here, should prove effective in destroying the eggs of this mite, where present; or, rather, the young on issuing from them. Micible oil sprays might be used against them with success also.

CONCLUDING REMARKS.

As will be seen from the foregoing report, much of the period embraced therein has been occupied by investigations away from Stanthorpe and by the annual leave.

It is hoped that before the fruit season opens the station here will have been equipped with a suitable insectary, a provision that is almost indispensable to the successful carrying out of projected experiments.

I am again indebted to many orchardists and others (particularly so to Mr. D. Taggart, The Summit, and to Mr. W. B. Wilson, Cotton Vale) for interesting specimens and material received. It is very gratifying to note the keen interest which is being taken in all matters pertaining to the control of the fruit fly in the Stanthorpe district.

Orchard Notes for September.

THE COAST DISTRICTS.

September is a busy month for the fruitgrowers in the coastal districts of this State, as the returns to be obtained from the orchards, vineyards, and plantations depend very largely on the trees, vines, and other fruits getting a good start now.

In the case of citrus orchards—especially in the Southern half of the State—it is certainly the most important month in the year, as the crop of fruit to be harvested during the following autumn and winter depends not only on the trees blossoming well but, what is of much more importance, that the blossoms mature properly and set a good crop of fruit.

This can only be brought about by keeping the trees healthy and in vigorous growth, as if the trees are not in this condition they do not possess the necessary strength to set their fruit, even though they may blossom profusely. The maintenance of the trees in a state of vigorous growth demands—first, that there is an adequate supply of moisture in the soil for the requirements of the tree; and, secondly, that there is an adequate supply of the essential plant-foods available in the soil.

With respect to the supply of moisture in the soil, this can only be secured by deep and systematic cultivation, excepting in seasons of good rainfall or where there is a supply of water for irrigation. As a rule, September is a more or less dry month, and when it is dry there is little chance of securing a good crop of fruit from a neglected orchard.

If the advice that was given in the Notes for August regarding the conservation of moisture in the soil has been carried out, all that is necessary is to keep the soil stirred frequently, so as to prevent the loss of moisture by surface evaporation. If the advice has been ignored, then no time should be lost, but the soil should be brought into a state of good tilth as quickly as possible.

Where there is a supply of water available for irrigation, the trees should receive a thorough soaking if they require it. Don't wait till the trees show signs of distress, but see that they are supplied with an adequate supply of moisture during the flowering and setting periods.

It is probable that one of the chief causes why navel oranges are frequently shy bearers in the coastal districts is that the trees, though they produce a heavy crop of blossoms, are unable to set their fruit, owing to a lack of sufficient moisture in the soil at that time, as during seasons when there is a good rainfall and the trees are in vigorous growth or where they are grown by irrigation, as a rule they bear much better crops. The importance of maintaining a good supply of moisture in the soil is thus recognised in the case of this particular variety of citrus fruit.

When the trees show the want of sufficient plant-food—a condition that is easily known by the colour of the foliage and their weekly growth, the orchard should be manured with a quick-acting, complete manure; such as a mixture of superphosphate, sulphate of ammonia, and sulphate of potash, the plant-foods in which are soluble in the water contained in the soil and are thus readily taken up by the feeding roots.

Although the above has been written mainly in respect to citrus orchards, it applies equally well to those in which other fruit trees are grown. Where the land has been prepared for bananas, planting should take place during the month. If the plantation is to be made on old land, then the soil should have been deeply ploughed and subsoiled and brought into a state of perfect tilth prior to planting. It should also receive a good dressing of a complete manure, so as to provide an ample supply of available plant-food. In the case of new land, which has, as a rule, been scrub that has been recently fallen and burnt off, the first operation is to dig the holes for the suckers at about 12 ft. apart each way. Good holes should be dug and they should be deep enough to permit the top of the bulb or corm of the sucker to be 6 in. below the surface of the ground.

Take great care in the selection of the suckers, and see that they are free from beetle borers or other diseases.

As a precaution it is advisable to cut off all old roots and to dip the corms for two hours in a solution of corrosive sublimate, made by dissolving 1 oz. of this substance in 6 gallons of water.

In old banana plantations keep the ground well worked and free from weeds and remove all superfluous suckers.

Where necessary, manure—using a complete fertiliser rich in potash, nitrogen, and phosphoric acid, such as a mixture of meatworks manure and sulphate of potash, 4 of the former to 1 of the latter.

Pineapples can also be planted now. The ground should be thoroughly prepared—viz., brought into a state of perfect tilth to a depth of at least 1 ft., more if possible—not scratched, as frequently happens; and when the soil requires feeding, it should be manured with a complete manure, which should, however, contain no superphosphate.

Old plantations should be kept in a good state of tilth and be manured with a complete fertiliser in which the phosphoric acid is in the form of bones, basic phosphate, or finely ground phosphatic rock, but on no account as superphosphate.

The pruning of custard apples should be carried out during the month, leaving the work, however, as late in the season as possible, as it is not advisable to encourage an early growth, which often means a production of infertile flowers. If the weather conditions are favourable, passion vines can also be pruned now, as if cut hard back they will make new growth that will bear an autumn crop of fruit instead of one ripening during the summer.

Grape vines will require careful attention from the time the buds start, and they should be regularly and systematically sprayed from then till the time the fruit is ready to colour with bordeaux mixture, in order to prevent loss by downy mildew or anthracnose.

Where leaf-eating beetles, caterpillars, or other insects are present, the trees or plants on which they are feeding should be sprayed with arsenate of lead. All fruit-fly infested fruit must be gathered and destroyed and on no account be allowed to lie about on the ground, as, if the fly is allowed to breed unchecked at this time of the year, there is very little chance of keeping it in check later in the season.

THE GRANITE BELT, SOUTHERN AND CENTRAL TABLELANDS.

Where not already completed, the winter spraying with lime-sulphur should be finished as early in the month as possible. Black aphid should be fought wherever it makes its appearance by spraying with a tobacco wash, such as black-leaf forty, as if these very destructive insects are kept well in hand the young growth of flowers, leaves, wood, and fruit will have a chance to develop. Woolly aphid should also be systematically fought wherever present, as once the trees are in leaf it is much more difficult to treat.

The working over of undesirable varieties of fruit trees can be continued. The pruning of grape vines should be done during the month, delaying the work as long as it is safe to do so, as the later the vines are pruned the less chance of their young growth being killed by late frosts. Keep the orchards well worked and free from weeds of all kinds, as the latter not only deplete the soil of moisture but also act as a harbour for many serious pests, such as the Rutherglen bug.

Grape vines should be swabbed with the sulphuric acid solution, mentioned in the Notes for August, when the buds begin to swell and just before they burst, as a protection against black spot and downy mildew.

New vineyards can be set out, and, in order to destroy any fungus spores that may be attached to the cuttings, it is a good plan to dip them in bordeaux mixture before planting. The land for vines should be well and deeply worked, and the cutting should be planted with one eye only out of the ground and one eye at or near the surface of the ground.

In the warmer parts which are suitable for the growth of citrus fruits, the land must be kept well cultivated, and if the trees need irrigating they should be given a good soaking, to be followed by cultivation as soon as the land will carry a horse without packing.

In these parts fruit-fly should be systematically fought, as it will probably make its appearance in late citrus fruits and loquats; and if this crop of flies is destroyed, there will be every chance of the early crops of plums, peaches, and apricots escaping without much loss.

Farm and Garden Notes for September.

With the advent of spring, cultivating implements play an important part in farming operations.

The increased warmth of soil and atmosphere is conducive to the growth of weeds of all kinds, particularly on those soils that have only received an indifferent preparation.

Potatoes planted during last month will have made their appearance above the soil, and where doubt exists as to their freedom from blight, they should be sprayed with either Burgundy or Bordeaux mixture as soon as the young leaves are clear of the soil surface.

Land which has received careful initial cultivation and has a sufficiency of sub-surface moisture to permit of a satisfactory germination of seeds may be sown with maize, millets, panicum, sorghums, melons, pumpkins, cowpeas, broom millets, and crops of a like nature, provided, of course, that the areas sown are not usually subjected to late frosts.

Rhodes grass may be sown now over well-prepared surfaces of recently cleared forest lands or where early scrub burns have been obtained, and the seed is sown subsequent to showers. More rapid growths, however, are usually obtainable on areas dealt with, say, a month later.

In connection with the sowing of Rhodes grass, farmers are reminded that they have the Pure Seeds Act for their protection, and in Rhodes grass, perhaps more than any other grass, is it necessary that seed of good germination only should be sown. A sample forwarded to the Department of Agriculture will elicit the information free of cost as to whether it is worth sowing or not.

Where the conditions of rainfall are suited to its growth, paspalum may be sown this month.

The spring maize crop, always a risky one, requires to be sown on land which has received good initial cultivation and has reserves of soil moisture. Check-row seeding in this crop is to be recommended, permitting as it does right-angled and diagonal cultivation by horse implements, minimising the amount of weed growth, and at the same time obtaining a soil mulch that will, with the aid of light showers, assist to tide the plant over its critical period of "tasselling."

Although cotton may be sown this month, it usually stands a better chance if deferred until October. The harvesting of cotton during the normal rainy season is, if possible, to be avoided.

The sowing of intermediate crops prior to the preparation of land for lucerne sowing should be carried out in order that early and thorough cultivation can take place prior to the autumn sowing.

The following subsidiary crops may be sown during the month:—Tobacco and peanuts, plant sweet potatoes, arrowroot, sugar-cane, and cow cane (preferably the 90-stalked variety), and in those districts suited to their production yams and ginger. Plant out coffee.

KITCHEN GARDEN.—Now is the time when the kitchen garden will richly repay all the labour bestowed upon it, for it is the month for sowing many kinds of vegetables. If the soil is not naturally rich, make it so by a liberal application of stable manure and compost. Manure for the garden during summer should be in the

liquid form for preference. Failing a sufficient supply of these, artificials may be used with good results. Dig or plough the ground deeply, and afterwards keep the surface in good tilth about the crops. Water early in the morning or late in the evening, and in the latter case, stir the soil early next day to prevent caking. Mulching with straw, leaves, or litter will be of great benefit as the season becomes hotter. It is a good thing to apply a little salt to newly dug beds. What the action of salt it, is not exactly known, but when it is applied as a top dressing it tends to check rank growth. A little is excellent for cabbages, and especially for asparagus, but too much renders the soil sterile, and causes hardpan to form. French or kidney beans may now be sown in all parts of the State. The Lima bean delights in the hottest weather. Sow the dwarf kinds in drills 3 ft. apart and 18 in. between the plants, and the climbing sorts 6 ft. each way. Sow Guada bean, providing a trellis for it to climb on later. Sow cucumbers, melons, marrows, and squash at once. If they are troubled by the red beetle, spray with Paris green or London purple. In cool districts, peas and even some beetroot may be sown. Set out egg plants in rows 4 ft. apart. Plant out tomatoes 3½ ft. each way, and train them to a single stem, either on stakes, trellis, or wire netting. Plant out rosellas. Sow mustard and cress, spinnach, lettuce, vegetable marrows, custard marrows, parsnips, carrots, chicory, eschalots, cabbage, radishes, kohlrabi, &c. These will all prove satisfactory, provided the ground is well worked, kept clean, and that water, manure, and, where required, shade are provided.

CERTIFICATES OF SOUNDNESS.

Certificates of Soundness as under-listed were issued in the course of July, 1922:—

Name of Stallion.	Breed.	Period for which Certificate issued.	Owner's Name.	Owner's Address.
Prince ..	Draught ..	Life ..	G. L. Petersen	Oakenden
Nelson ..	Draught ..	Life ..	A. M. Johnson	Blythe Farm, Grace-mere
Silvers Royal	Draught ..	12 months	A. M. Johnson	Blythe Farm, Grace-mere
Prince of Invermay	Clydesdale ..	12 months	J. McAllister ..	Forest Hill
Pride of the Valley	Draught ..	12 months	F. Zischke ..	Glencoe Grove, Forest Hill
Lochinvar ..	Clydesdale ..	12 months	D. C. Griffiths ..	Mount Forbes
Prospector ..	Clydesdale ..	12 months	Dept. of Agriculture and Stock	Gatton College, Gatton
Mauvenhoff ..	Thoroughbred	Life ..	J. Dalton ..	Ellensfield, Nebo
Windsor ..	Thoroughbred	Life ..	B. J. McGuire ..	Mackay
Malt Bush ..	Thoroughbred	Life ..	A. Shannon ..	Salt Bush Park, St. Lawrence
King-o'-Malt	Blood ..	Life ..	P. J. Frawley ..	Strathpine
Eudois ..	Blood ..	Life ..	Messrs. Neilson and Murphy	Flinders st., Townsville
Pah King ..	Blood ..	Life ..	F. Smith ..	Townsville
Brown Lad ..	Blood ..	Life ..	H. Jannusch ..	Haden
Metrose ..	Blood ..	12 months	W. Ingle ..	Eumundi
Major Marcus	Trotter ..	Life ..	Rees Thomas Ltd.	Townsville
Master Cole ..	Trotter ..	12 months	W. Abrahams ..	Glanmorgan Vale
Sir Butler ..	Pony ..	Life ..	F. Bell ..	Bolsover st., Rockhampton
Joker ..	Pony ..	Life ..	Mrs. A. L. Mackay	Pinnacle, Mackay
Trafalgar ..	Pony ..	Life ..	C. Shepperd ..	Mackay
Dandy's Pride	Pony ..	Life ..	B. J. McGuire ..	Mackay
Pinto Ben ..	Pony ..	Life ..	J. O'Sullivan ..	Excelsior Hotel, Rockhampton
Black Pastal ..	Pony ..	Life ..	H. Arndt ..	Tallegalla
Brownie ..	Pony ..	Life ..	J. H. Ruhwedel	Murphy's Creek

ASTRONOMICAL DATA FOR QUEENSLAND.

Times Computed by D. EGLINTON, F.R.A.S.

TIMES OF SUNRISE AND SUNSET.

AT WARWICK.

1922.	JULY.		AUGUST.		SEPTEMBER.	
Date.	Rises.	Sets.	Rises.	Sets.	Rises.	Sets.
1	6.45	5.6	6.36	5.20	6.7	5.37
2	6.45	5.6	6.35	5.21	6.6	5.38
3	6.45	5.7	6.35	5.21	6.5	5.38
4	6.45	5.7	6.34	5.22	6.4	5.38
5	6.45	5.8	6.33	5.23	6.3	5.39
6	6.45	5.8	6.32	5.24	6.2	5.39
7	6.45	5.9	6.31	5.24	6.1	5.40
8	6.45	5.9	6.30	5.25	6.0	5.40
9	6.44	5.10	6.29	5.26	5.58	5.41
10	6.44	5.10	6.28	5.27	5.57	5.41
11	6.44	5.10	6.28	5.28	5.56	5.42
12	6.44	5.11	6.27	5.28	5.55	5.42
13	6.43	5.11	6.26	5.29	5.53	5.43
14	6.43	5.12	6.25	5.29	5.52	5.44
15	6.43	5.12	6.24	5.30	5.51	5.45
16	6.42	5.13	6.23	5.30	5.50	5.45
17	6.42	5.13	6.22	5.31	5.49	5.46
18	6.42	5.14	6.21	5.31	5.48	5.46
19	6.41	5.14	6.21	5.32	5.47	5.46
20	6.41	5.15	6.20	5.32	5.46	5.46
21	6.41	5.15	6.19	5.32	5.44	5.46
22	6.40	5.16	6.18	5.33	5.43	5.47
23	6.40	5.16	6.17	5.33	5.42	5.47
24	6.39	5.17	6.16	5.34	5.41	5.47
25	6.39	5.17	6.15	5.34	5.40	5.48
26	6.38	5.18	6.14	5.35	5.39	5.48
27	6.38	5.18	6.13	5.35	5.38	5.49
28	6.37	5.19	6.12	5.36	5.37	5.49
29	6.37	5.19	6.11	5.36	5.36	5.50
30	6.36	5.20	6.10	5.37	5.35	5.50
31	6.36	5.20	6.9	5.37	...	...

PHASES OF THE MOON, OCCULTATIONS, &c.

The times stated are for Queensland, New South Wales, Victoria, and Tasmania when "Summer Time" is not used.

		H. M.
2 July	(First Quarter	8 52 a.m.
9 "	○ Full Moon	1 7 p.m.
17 "	) Last Quarter	3 11 p.m.
24 "	● New Moon	10 47 p.m.
31 "	(First Quarter	2 22 p.m.

Apogee on the 15th at 3.24 a.m.

Perigee on the 27th at 1.30 a.m.

About 8 o'clock in the evening of 29th July the apparent nearness of the Moon and the giant planet Jupiter low down in the west will form a very interesting spectacle; there will be an occultation of Jupiter about 9 o'clock.

8 Aug.	○ Full Moon	2 19 a.m.
16 "	) Last Quarter	6 46 a.m.
23 "	● New Moon	6 34 a.m.
29 "	(First Quarter	9 55 p.m.

Apogee on the 11th at 6.54 p.m.

Perigee on the 24th at 5.42 a.m.

During the evenings of 14th, 15th, and 16th August the planets Venus and Saturn will, with Eta Virginis, a second magnitude star, form an interesting group in the north-west.

6 Sept.	○ Full Moon	5 47 p.m.
14 "	) Last Quarter	8 20 p.m.
21 "	● New Moon	2 38 p.m.
28 "	(First Quarter	8 40 a.m.

Apogee on the 8th at 4.12 a.m.

Perigee on the 21st at 3.36 p.m.

About 3 o'clock on the afternoon of 30th September a pair of binoculars should afford a view of the Moon and a third magnitude star—Beta Capricorni. In the course of an hour the star may be seen in a small telescope to disappear suddenly on the eastern side of the Moon and reappear on its western side.

The planet Venus will be at its greatest height in the western sky on 15th and 16th September.

The Great Australian Solar Eclipse will occur on 21st September between a few minutes after 3 p.m. to about a quarter past 5.

For places west of Warwick and nearly in the same latitude, 28 degrees 12 minutes S., add 4 minutes for each degree of longitude. For example, at Inglewood, add 4 minutes to the times given above for Warwick; at Goondiwindi, add 8 minutes; at St. George, 14 minutes; at Cunnamulla, 25 minutes; at Thargomindah, 33 minutes; and at Oontoo, 43 minutes.

The moonlight nights for each month can best be ascertained by noticing the dates when the moon will be in the first quarter, and when full. In the latter case the moon will rise somewhat about the time the sun sets, and the moonlight then extends all through the night; when at the first quarter the moon rises somewhere about six hours before the sun sets, and it is moonlight only till about midnight. After full moon it will be later each evening before it rises, and when in the last quarter it will not generally rise till after midnight.

It must be remembered that the times referred to are only roughly approximate, as the relative positions of the sun and moon vary considerably.

[All the particulars on this page were computed for this Journal, and should not be reproduced without acknowledgment.]

Queensland

Department of Agriculture and Stock

Volume XVIII



SEPTEMBER, 1922

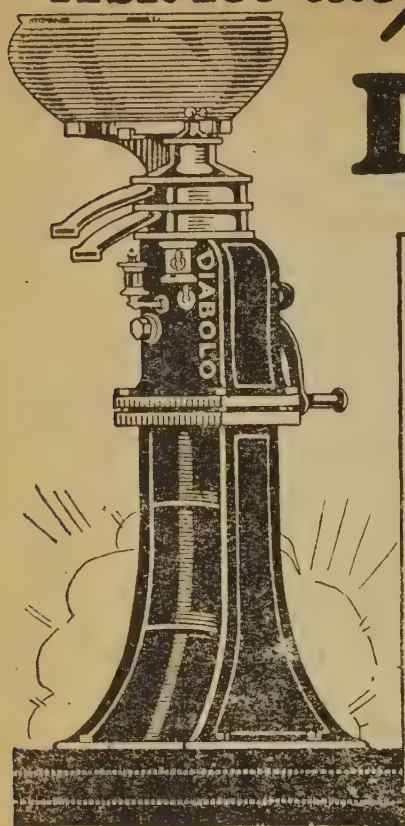
Queensland Agricultural Journal



**REGISTERED AT THE GENERAL POST OFFICE, BRISBANE,
FOR TRANSMISSION BY POST AS A NEWSPAPER.**

**Edited by
J. F. F. REID**

Ask for the / **BABY** / **DIABOLO**



Just what the Small Dairyman
wants for his own personal use

GRANTING that you know all about the merits of the DIABOLO—its economy, hygienic properties and rugged quality—we wish to draw your attention to the "Baby" of the DIABOLO family. This youngest member has a 10-gallon capacity. Does all the things its big brother can do; the gearing is the same, the precision identical; size is the only difference. A tiny chap that gives up every particle of thick, rich cream. Other small DIABOLOS are of 15 and 27 gallon capacity. Will you not write and ask us to tell you more about these "BABY" DIABOLO SEPARATORS?

DIABOLO SEPARATOR CO. LTD.
CREEK STREET, BRISBANE

SEED MAIZE

of all the leading varieties for present planting. All nice samples, topped and tailed, and true to name.

SUDAN GRASS—The Wonder Crop

As a drought resister Sudan has proved itself one of the best. Cut green, or in the form of hay, it is relished by all stock, and its fodder value compares most favourably with wheat or lucerne hay. Write for quotation, if interested.

SEED POTATOES, nice seed size, nicely shooting, all ready for immediate planting, of the following varieties—Carmens, Brownell Beauties, Guyra Blues, Satisfactions, etc.

Also *Japanese Millet, Panicum, White Panicum, Sorghum, Paspalum, Rhodes Grass, Saccaline, etc.*

Cow Peas for green manuring. We are still booking orders for *Fruit Trees* of all kinds; *Citrus Trees, Rose Trees*, of every description.

Vegetable and Flower Seeds of all kinds for the farm and garden.

CHARLES TAYLOR & Co.

"THE LEADING SEEDSMEN"

124-128 ROMA STREET, BRISBANE

VOL. XVIII., PART 3.]

SEPTEMBER, 1922.

Registered at the General Post Office for Transmission by Post as a Newspaper.]



THE
QUEENSLAND AGRICULTURAL JOURNAL,

ISSUED BY DIRECTION OF

THE HON. THE SECRETARY FOR AGRICULTURE.

EDITED BY J. F. F. REID.

VOL. XVIII. PART 3.

SEPTEMBER.

By Authority:

ANTHONY JAMES CUMMING, GOVERNMENT PRINTER, BRISBANE.

1922.

We are Bag Specialists

For Farmers—For Farmers—For Farmers

Bags for Wheat, Maize, Chaff, Peas, Beans, etc.:

Any sort or kind.

New or Second Hand.

**For Storekeepers, Meat Exporters, Flour
Millers, Bacon Curers, etc.**

All kinds of Hessian and Calico Bags Printed to
your own design.

For Packing, Signwriting, Plastering, etc.

Hessian and Calico all widths and grades.

Joyce Bros. (Q.) Limited

Stanley Street, South Brisbane

→ A Business Proposition ←

It is in your interests to support an Institution established for the benefit of the people of Queensland; *therefore*, consult *The Public Curator*, whose Office exists for your benefit, in all matters relating to the making of Wills (free of charge), Administration of Estates, taking over Existing Trust Estates, carrying on businesses as Attorney, lending money on First Mortgage of Real Estate, giving legal advice free, registering Transfers, preparation of Agreements, etc.

*Branch Offices at ROCKHAMPTON and TOWNSVILLE,
and Agencies at all Court Houses in Queensland.*

F. W. MOLE

Public Curator, Brisbane

CONTENTS.

	Page.		Page.
The Great Solar Eclipse (D. Eglinton, F.R.A.S.)	139	Royal National Exhibition— <i>continued.</i>	
The Physiology of Northern Australia— I. (H. I. Jensen)	140	Swine	227
Sugar: Field Reports	143	Farm Produce	229
Cane Pest Combat and Control	146	Fruit	230
An Efficient Soil-fumigant for Cane Grubs,	148	Apiculture	230
Oil for Shale	151	Science Notes (E. Jarvis)	231
A Summary of Some Experiments Carried out by the Bureau of Sugar Experiment Stations—IV. (H. T. Easterby)	151	The Dairy Herd, Queensland Agricul- tural College, Gatton	232
Rainfall in the Agricultural Districts ...	157	Report on Egg-laying Competition, Queensland Agricultural College, July, 1922	232
The Human Machine on the Land ...	158	National Utility Poultry Breeders' Association Competition	233
Queensland Trees (C. T. White)	159	Certificate of Soundness	236
Royal National Exhibition—		Organisation of the Agricultural Industry	237
Departmental Court Exhibits	165	The Primary Producers' Organisation Act	243
District Exhibits	195	Burnett Cane Crop Prospects	246
Fresh Butter	204	Editorial Notes—	
Cheese—Export Classes	206	Co-operative Butter Selling	247
Home Milking	209	Event and Comment—	
Milking Tests	211	The Cotton Guarantee	248
Bacon, Hams, and Lard	219	The Boll-worm Menace to Queens- land Cotton	248
Young Judges' Competition	220	General Notes—	
Horses	220	To Correspondents	249
Cattle	221	Cassaba Melon Seeds	249
Stud Beef Herds	223	Farm and Garden Notes for October ...	249
Dairy Cattle	223	Orchard Notes for October	250
Fat Cattle	226	Astronomical Data for Queensland ...	252
Stud Sheep	227	Departmental Announcements	xiii.
Fat Sheep	227		

Queenton Seeds We Grow

Early Jewel and Ponderosa Tomato, Sugar Melon,
Giant Rock Melon, Iceberg Lettuce, Giant Rhubarb,
White Spine Cucumber, Rosella, Crested Cosmos,
Giant and Striped Zinnia, Double and Single
Dianthus, Phlox, Calendula, Sweet Peas, etc.

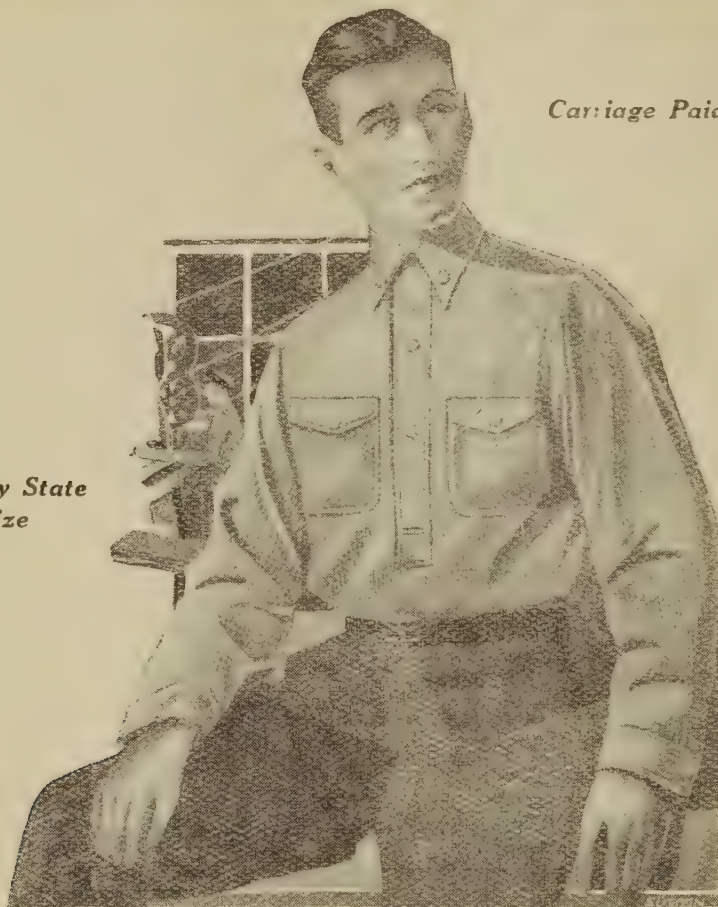
All 6d. per packet

SEED LIST ON APPLICATION

E. MANN & SON

Seed Growers

Charters Towers



Carriage Paid

*Kindly State
Size*

The "STRONGHOLD" WORK SHIRT

*Made to meet the
Extreme Demands of
Service*

11/6 Each
3 for 33/-

FIVE LIGHT AND DARK PATTERNS

The "STRONGHOLD" is one of the group of Work Shirts produced by our own Shirt-making Department on the premises. Each Shirt is a mass of strength and wear in material and making—cut and designed by expert Shirt makers—strongly sewn throughout, and finished with finest trimmings, with Buttons firmly sewn on. Observe the two Breast Pockets—Button Collar—and comfortable fullness of Sleeve and Body—features of a good Work Shirt.

MAIL FOR THREE RIGHT AWAY
To Desk A.J.

PIKE BROTHERS

LIMITED

Townsville

BRISBANE

Toowoomba

QUEENSLAND AGRICULTURAL JOURNAL

VOL. XVIII.

SEPTEMBER, 1922.

PART 3.

THE GREAT SOLAR ECLIPSE.

By D. EGLINTON, F.R.A.S.

Written especially for the "Queensland Agricultural Journal."

All dwellers upon the land, and especially those who seldom or never see a picture show, should look forward to and make every possible preparation to observe the Great Solar Eclipse which will occur in the afternoon of Thursday, 21st September. Of all the grand phenomena of Nature none exceeds the magnificent spectacle which a total eclipse of the sun affords. It will be only in certain parts of Australia, of which Queensland in its southern portion will have a large share, that the full grandeur of totality will be observable; but more or less of the eclipse of the sun will be seen from every part of our island continent where the sky in the direction of the sun is free from clouds.

The places in Queensland where totality will occur—that is, where the moon will entirely cover every bit of the sun's face—lie between Beaudesert and Grafton on the east coast, and between Beetoota and Oontoo in the south-west. Whether the inhabitants of these two western towns will actually get the full effects of totality or, like Southport and Glen Innes, will have merely a very near approach to it, is somewhat doubtful. It will be of much interest if careful observations are made at both these western towns to enable this point to be decided. If the last scrap of the sun's brilliant surface disappears, there will be a momentary chance of seeing some of the great red prominences which occasionally leap out for many thousands of miles, and even the corona which extends much further from the sun, either completely surrounding it or noticeable in wide bands or streaks varying considerably at different total eclipses. At such places as Stanthorpe, St. George, Coongoola, Toompine, and the north-east corner of Durham Downs, the total phase will last for about three minutes, and the grandest features of the eclipse should be very well seen if favourable weather conditions prevail.

Those persons who are situated north of a line which can be drawn on a map through Beaudesert and Beetoota, or south of a line through Grafton and Oontoo, should go a few miles further south or north, as the case may be, to get well into the path of totality—a belt of land about 115 miles wide, between the two lastmentioned lines. Midway between them, on the central line which runs through Casino on the east coast and passes westwards about 4 miles south of Stanthorpe and the same distance north of Goondiwindi and south of Coongoola, will indicate the best positions for viewing the great phenomenon.

Heights, such as Stanthorpe affords, where there is a wide view of the landscape westwards and eastwards, form the best positions from which observers may see the great weird shadow cast by the moon rush towards them at a great speed. Then it will be quite safe to look up at the sun without coloured or smoked glass, which, however, should be provided to watch the first indication of the moon's encroachment. This will be about 3 o'clock in the afternoon; then for a little more than an hour it will

be interesting to notice through coloured (red and green combined) or smoked glass, the round face of the sun undergo the changes in shape which are presented by the moon each month between its phases from full to new, and vice versa for an hour or more after totality. More or less of this will be noticeable all over Australia, but to a very limited extent in far north-east or south-west. Only within, and perhaps near, the path of totality, will the strange shadow-bands be seen to flit over the landscape a little before totality takes place.

In the favoured zone, observers (men, women, and children—none should lose this splendid opportunity) should be careful to prevent their eyes being too much affected by glare so as to make them incapable of seeing the corona which can be seen to the best advantage by those who remain blindfolded for a few minutes beforehand. In his splendid popular work on astronomy, “The Story of the Heavens,” the late Sir Robert Ball mentions that when the sky is clear during a total eclipse of the sun, the moon appears of an inky darkness, not like a screen, but like the huge black ball that it really is.

The sun and the moon are apparently about the same size. A threepenny piece held out at arm's length is apparently bigger than either, but Sir Robert Ball tells us that if the sun were cut up into a million pieces, each would be larger than the earth, and that “if the earth were cut into fifty pieces all equally large, then one of those pieces rolled into a globe would equal the size of the moon.” Therefore the sun is more than 50,000,000 times the size of the moon. The comparative nearness of the moon to the earth and the enormous distance (fortunately) of the sun, of course, account for the apparent similarity in size. When, however, the eclipse takes place at the time of our spring equinox, the moon will look bigger than the sun, because it will be in that part of its slightly elliptical orbit, which brings it in perigee.

Thus a combination of favourable circumstances will give this occasion more than ordinary value for scientific purposes: one of which is to obtain for a second time a test of the correctness of Einstein's Relativity Theory of Gravitation. On the last occasion, when the apparent positions of stars which seemed to be nearly in a line with the sun during a total eclipse in 1919 were compared with positions photographed after the sun had moved from that position, sufficient evidence was afforded to fairly prove that Einstein is right. The rigid exactions of science make this second test one of considerable importance for that purpose alone. There are other reasons, such as obtaining more information on the nature of the sun's corona. Mrs. Todd, in her famous little book on Total Eclipses of the Sun, says, “It is told of the late Professor Snell, of Amherst College, that he once asked for a definition of the solar corona from a member of his class in Astronomy, who after a good deal of hesitation, and feeling desperately on the brink of utter failure, plunged into the statement that he *did* know what the corona was, but had forgotten. ‘What an incalculable loss to science!’ said the Professor, with characteristic humour; ‘the only man who ever knew what the sun's corona is, and he has forgotten!’”

Although as an average there are about seventy total eclipses of the sun in a hundred years, their infrequency at any particular place, such as London, is remarkable, a period of over eight centuries having elapsed without one. Yet at the small island, Blanquilla, in the Carribean Sea, south of the Leeward Islands, two total eclipses were visible in the short space of three years, and it is probable that the total solar eclipse of 10th September, 1923, will be seen there also; in any case it will be visible as a very fine eclipse of the sun. So that it will be seen that eclipses, like kisses, go by favour.

During the total phase of our coming eclipse, which there is some reason to expect will be a *dark* one, the planets Saturn, Mercury, Jupiter, and Venus will be visible on the eastern side of the sun, Saturn being nearest (within two diameters of the moon), Mercury and Jupiter rather close together, but about as far from Saturn as it will be from the sun; then Venus, the most brilliant, about as far from Jupiter. Only those situated within the path of totality will be likely to see all these.

THE PHYSIOGRAPHY OF NORTHERN AUSTRALIA.—I.

By DR. H. I. JENSEN, Geological Survey, Brisbane.

In this contribution I propose to give my own observations on Soils and Physiography in Queensland, and to Supplement observations made by myself and colleagues, Messrs. Gray and Winters, in the Northern Territory.

THE NORTHERN TERRITORY.

LITERATURE DEALING WITH N.T. PHYSIOGRAPHY.

1. Memoir No. 1, Advisory Council of Science and Industry, entitled, “The Australian Environment,” by Dr. Griffith Taylor.

2. Bulletin No. 10 of The Northern Territory, published by the Commonwealth Department of Home and Territories, "Geological Report on the Darwin Mining District, the McArthur District, in the Barkly Tablelands," by Dr. Dr. H. I. Jensen, Chief Geologist.
3. Bulletin No. 14 (of the N.T.), "Report on the Country between Pine Creek and Tanami," by Dr. Jensen; "Reconnaissance of North West Arnhemland," by G. J. Gray, B.E., BSc.; "Observations on the Country between Pine Creek and Newcastle Waters," by R. J. Winters, F.G.S.
4. Bulletin No. 16 (of the N.T.), "The Geology of the Waggaman Province," by Dr. H. I. Jensen, G. J. Gray, and R. J. Winters.
5. Bulletin No. 19 (of the N.T.), "Report on the Geology of the Agicondi Province," by Dr. H. I. Jensen.

Much information briefly descriptive of Territory Physiography can be obtained from the foregoing.

The following are the principal points to be noted:—

1. The Northern Territory is a peneplain elevated in the Cainozoic period. Elevation commenced after the deposition of the Cretaceo-Eocene belemnite bearing beds. It has been a slow movement and persists even to the present day, except in the extreme north-east corner of the Territory, the English Company Islands, and the Carpentaria coast from Cape Wilberforce to Cape Gray.

2. The Northern Territory has undergone no compressional earth movements since the early Palæozoic period. Even Cambrian rocks are but slightly folded. Movements have been of the vertical, isostatic type. Late Palæozoic (Permo-Carboniferous) and Mesozoic rocks have been laid down during periods of marine transgression.

3. Evidences of Cainozoic uplift are obtained in the form of raised beaches on the west coast, in Tertiary beds and raised beaches on the north coast, and in raised beaches and in the advance of *belar* (*Casuarina glauca*?) over the mangroves (*Rhizophora* species) on the Gulf of Carpentaria coast south of Blue Mud Bay. Evidence of uplift can also be got in the nature of the river channels. The rivers are cutting down and in many places show distinct terraces. In places great canons have been cut, as in the case of the Upper Katherine and the McArthur Rivers, between Borrooloola and McArthur Station. The principal rivers prior to the uplift and during the early stages of the uplift flowed north, but the present day principal drainage direction is east and west. Great river captures have been effected.

4. Climatically and in vegetation the Territory can be divided into three zones—

(A) *Coastal Plain*.—Sedimentary rocks and metamorphics alike on this zone capped with laterite, which is disintegrating owing to increasing moisture of climate. Rainfall, 45 to 65 inches in heavy tropical falls during wet months. Country lightly timbered with *Eucalyptus grandifolia*, *E. papuana*, *E. miniata*, *E. tetradonta*, *E. terminalis* and numerous species of *Acacia* (*A. auricaliformis*, *A. holoserica*, &c.), *Grevillea*, *Hakea*, *Careya* (cockatoo apple), *Buchanania*, *Gardenia*, *Eugenia*, *Alstonia*, &c. The soils are mostly very poor, and covered in the wet season with a dense growth of innutritious reed-like grasses, which should make good paper pulp, and grow to a height of from 6 to 14 feet. Whiteant (termite) nests abound, and in patches are of the "magnetic" variety—that is, flat structures elongated in the magnetic north-south direction. Tea Tree (*melaleuca*) swamps are abundant. The coast is fringed with mangrove (*Rhizophora*, &c.).

(B) *The Hill Country* usually from 100 to 200 miles from the coast but hugging the coast closer in the north-west and west. The metamorphic rocks and granites are dissected into rough hills, on many of which occur cappings (mesas) of table sandstone. These mesas are often capped with laterite which was once co-extensive with the coastal laterites. The rainfall ranges from 20 to 45 inches per annum. The vegetation consists of stunted forest in which *Eucalyptus alba* is a prominent member. Besides *Eucalyptus alba*, we have *E. Foelschiana*, *E. Spenceriana*, *E. latifolia*, *E. grandifolia*, *E. phœnicia*, *E. tetradonta*, *E. miniata*, *E. setosa*, *E. clavigera*, *E. dichromophloia*, *E. houseana*, *E. microtheca*, *E. ptycophylla*, and *E. melanophloia*. (This species has the character of a box except in the Wandji district, where it is an ironbark.*) We have also ironwood (*Erythrophloeum Labouchei*), *Calythrix*, *Verticordia*, *Acacia Bidwilli*, *Acacia holoserica*, *A. tumida*, *A. latifolia*, and many other

*Mr. J. H. Maiden, who is monographing the genus *Eucalyptus*, writes me that he is making a new species of this ironbark.

wattles. This belt is, however, typically the poplar gum (*E. alba*) belt, since on all alluvial flats *E. alba* is dominant. Stringybark (*E. tetradonta*) is typical principally of the most sandy, poor soils. A common wood in very sandy country is also quinine (*Petalostigma quadriloculare*), kapok (*Bombax malabaricum* (?)).

The soils are mostly poor. The grasses are better than on the coast, but cannot be called good feed for stock. "Magnetic" white ant nests are not met with, but the termite nests are of large size.

As we pass over on to the interior slopes the mesas of sandstone become clad with lancewood (*Acacia deratoxylon*), and belts of pine (*Callitris calcarata*).

(c) *Inland Areas*.—These areas are roughly divisible into—

(a) *Plains*, with rich black soils of limestone derivation and covered with Mitchell and Flinders grass, blue grass and blue bush. No forest trees are seen at all over large areas, but where trees occur the dominant timber is Bauhinia. Nutwood (*Grevillea gibbosa* (?)) belts also occur, also patches of *Eucalyptus pruinosa*, and along the watercourses mulga (*Acacia aneura*), gidgee (*Acacia cambagei*), and gutta-percha (*Excaccaria parvifolia*). Right in the midst of the blacksoil plains an occasional clump of whitewood (*Alstonia constricta* (?)) may be met with.

The plains country is the pick of the Territory from the pastoralists' viewpoint, but surface waters are scarce, although on the coastal fall most of the Victoria River basin is climatically and physiographically a part of the "Inland Area."

(b) *Desert Country*.—This is the local name for wooded poor country, such as occurs on sandstone, metamorphic, and granite areas. The grasses are useless for stock. The principal stock feed in the "desert" belts is bush, the leaves of hakea, capparid, &c. Occasional permanent billabongs are found, whereas the plains are destitute of natural waters, and rely on the subartesian.

The vegetation is a mixture of desert gum, mallee, wattle (*acacia*), wild orange (*capparis* sp.), emubush, beefwood (*hakea*), quinine (*petalostigma*), and other dry country genera.

The Eucalypts met with are solely of the desert type—*E. aspera*, *E. eudesmioides*, *E. pyriformis*, *E. oleosa* (?), *E. gamophylla*, *E. salmonophloia* (?), *E. macrocarpa*, *E. peltata*, *E. tetragona*, *E. salubris*, *E. odontocarpa*, *E. ptychocarpa*, and so on. In the Victoria River Country, West Australian types occur; in the Barkly Tableland, Queensland types.

White ant nests occur only in the desert areas. Flies are bad on the plains in the wet season.

The Coastal and Hill Country is tick infested, but the inland country is tick free.

A much fuller description of the country, and of the vegetation is given in a paper written by the writer in 1916, but which is still unpublished, as I left the Federal Government service soon after, and the report was too long and detailed to expect a scientific society to print. Besides a large number of maps illustrating the physiography were necessary, and I have not had time or the facilities since to finish this work.

5. The extreme north-east of the Territory is a subsiding area, as shown in Bulletin No. 10 of the Northern Territory.

6. The climate of the Territory seems to be growing wetter, as evidenced by the erosion and disintegration of the laterites.

7. The Territory is essentially a mining and pastoral country. It is unsuited for agriculture even with irrigation. The soils of the Coast and Hill Belts are too poor and the inland soils too heavy, and in any case the engineering difficulties in the way of irrigation are almost insuperable, especially to obtain a water supply.

8. The inland flora is very rich in essential oils which may in time be the source of a payable industry. The coastal grasses should be useful for paper pulp manufacture. Spinifex (*Triodia*) is the most abundant grass on the desert country. Poison bush (*Gastrolobium*) occurs in patches. Rolyoly (*Salsola*) is also a common herb. Many of the acacias, grevilleas, and hakeas are extremely spinose—the leaves terminating in a sharp horny point. Setose leaves characterise many of the Eucalypts, and angular branches and grooved seedpods are also common features of the inland flora.

[TO BE CONTINUED.]

SUGAR : FIELD REPORTS.

The Southern Field Assistant (Mr. J. C. Murray) reports under date 11th August, 1922, as follows:—

In the course of the month the districts of Bundaberg (Woongarra and Barolin), Bingera, Gin Gin, Bucca, Avondale, Fairymead, and Childers have been visited.

Woongarra.—The crops here have improved greatly during the last month. A fair amount of cultivation is at present being done, in preparation for the spring planting. Growers should have successful strikes, for the soil is now in a moist condition. Provided deep cultivation takes place there should be enough moisture in the ground to last some months without rain. Of the staple varieties, probably 1900 Seedling is looking the best. Other canes showing well are H.Q. 285, H.Q. 426, Badila, E.K. 1, Shahjahanpur No. 10, Q. 970, Q. 1098, and Q. 813. There is a great need for the growers to show a continued and intelligent interest in the different cane varieties, as there is always the danger that the canes upon which they are depending will become diseased, or otherwise deteriorate. Each farmer should have a small plot set apart for experiments with fertilisers and different canes, on what he considers a piece of soil typical of the rest of his farm. Absolutely conclusive results would follow, and if on raising his cane varieties he found one particularly suited for his farm, he could gradually work it in to the main areas as a change, if not to entirely displace one of his staple varieties.

On the Woongarra soils growers are advised to use green maize as well as cowpea and Mauritius bean for green manuring. Even if allowed to mature, maize is a very beneficial rotation crop.

Barolin.—On this area the cane has greatly improved during the last couple of months. The farmers have some good crops to cut now, whereas about mid-autumn their chances looked very ordinary indeed. A few frosts have occurred here lately, but owing to the increased resistance of the cane and the moist nature of the soil, these did very little damage. Still, frosts may come again here when conditions are not so favourable, and growers are advised to observe their cane carefully with a view to determining which are the most resistant. The Shahjahanpur No. 10 is recommended to the farmers in this respect, this cane lately showing considerable promise where careful plant selection has been studied. Another variety that should do well on the Barolin soil as a spring plant crop is E.K. 1. It is probable here than early spring planting generally would be the most favourable for the growers. Careful consideration should be given by growers to fertilisation of these soils. Green manures that should be beneficial are cowpea, Mauritius beans, Soya beans, velvet bean, and maize. Should ratoons be shy, a light dressing of sulphate of ammonia or nitrate of soda would be beneficial.

Bingera.—The cane in this district looks very well. Growers are going to take off some heavy crops as, in common with other districts, the tonnages have greatly increased during the last six weeks.

Canes presenting a good appearance are D. 1135, 1900 Seedling, N.G. 16, Q. 813, Malagache, and D. 156.

The young plant cane looks very healthy, and should make good growth during the ensuing months. There appears to be a marked absence of parasites that inhabit the soil, also fungoid or bacterial parasites. This is no doubt due, in the latter cases, to careful plant selection, and in the former instance to checking by thorough cultivation. Positive fertilising results are being obtained by the use of meatworks manures, $\frac{1}{2}$ ton of bonedust per acre giving satisfactory results.

Gin Gin.—The farmers generally express themselves as satisfied with their prospects. The cane has responded wonderfully since the beginning of April. The farm drains and creeks are all running strongly, and everything indicates a good supply of sub-surface moisture to draw from during spring if the farmers can reach it by deep cultivation.

Varieties at present looking well are Black Innis, 1900 Seedling, and D. 1135. These three canes, especially the two latter ones, are the staple varieties, but the Demerara cane is rapidly losing its vigour. Growers should concentrate on experimenting with other varieties to displace this cane, for a period at least. In this respect it is recommended that they try Q. 813, E.K. 1, E.K. 28, and Q. 970. All these may be obtained at the distribution periods at the Bundaberg Sugar Experiment Station on application, if available. Black Innis is a variety that is doing well on the high forest loams, growing to good length and early maturity. More green manuring is being done now on the Gin Gin areas than hitherto. As an instance of

the depth of soil found on typical Gin Gin farms, one farmer is sinking a well at present and has already gone through 30 feet of pure volcanic soil. Water is expected at about 45 feet.

The importance of plant selection as a method of combating disease and preventing deterioration is again impressed upon the farmers.

Bucca.—A brief visit was made to Bucca in the course of the month. The cane here looks very healthy, and good tonnages should result. New land is being broken up and planted, as well as areas that have not been cultivated for a number of years. On soils such as these, that have been used only for grazing, methodical green manuring should be undertaken. Lime is essential now on most of the Bucca land; in fact, practically all the land on this section of the Kolan River would have its texture improved and a greater availability of potash would be created by liming.

The growers are recommended to obtain and experiment with varieties such as E.K. 1, E.K. 2, E.K. 28, H.Q. 285, and Q. 970.

Avondale.—An outstanding feature of the crops here is the healthy and heavy crop of D. 1135. If some of this cane growing on the light loams at Avondale could be used as plants on the volcanic soils, it would probably show great improvement. The farmers here are busy cutting.

Uba cane is giving good tonnages, and the results of this variety are satisfactory. Two other canes looking well here are Q. 813 and D. 1135 Sport.

Nut grass is not causing any serious concern here, the growers tending the cane carefully until a certain age, when it defeats this noxious weed.

The borer parasite has practically disappeared; very few growers complain of any infestation.

Fairymead.—The cane looks remarkably well, with healthy top indicating the absence of leaf disease or fungoid parasites. Crushing is at present proceeding satisfactorily. Owing to the completeness of the plantation equipment, good cultivation is always carried out, powerful tractors making the disturbing of the soil to considerable depth an easy matter. The company is also doing good work with a tractor of the caterpillar type at Springhill. This machine travels at the rate of about three miles per hour, and gets over a lot of ground.

Varieties giving good results at Fairymead at present are Uba and D. 1135, these two canes being the staple varieties. Some very good samples of H.Q. 283 are at present coming to the mill from Mr. Scotney's farm at Moorlands, a variety that the company intends to partially plant on their land at Childers.

Childers.—Good tonnages of cane are in evidence, the growers expecting a small reduction on the original estimate. 1900 Seedling and D. 1135 are the canes most frequently met with, but on some farms Q. 1098, 813, 907, N.G. 87, and H.Q. 77 are making a good showing. Very little disease is noticeable in the cane at present, and the grub is not expected to cause much loss during the coming year.

The growers are advised to practise changing of plants as much as possible, because this has proved, as the result of visiting hundreds of farms in Queensland, to be effective in maintaining a cane variety true to type and resistant to disease, provided careful selection is carried out. Fertilising is being carried out fairly generally in the Childers district. From an analysis of a typical scrub loam soil it would appear that a fertiliser consisting of 300 lb. sulphate of ammonia, 100 lb. potash, and 300 lb. bone meal per acre could be used to advantage. Dressings of sulphate of ammonia and nitrate of ammonia would probably be beneficial to backward ratoons. Good results have been obtained by a grower at North Isis by using 3½ cwt. bonedust per acre. This grower is increasing his application to 5 cwt. per acre. At present there is a great need in the Childers district for deeper cultivation, as there is a hard pan of earth formed on an average of about 10 inches below the surface which needs breaking. The mills are now in full swing with an adequate supply of efficient labour. No industrial disputes have arisen of any moment.

The Northern Field Assistant (Mr. E. H. Osborn) reports under date 8th August, 1922, as follows:—

Innisfail.—Upon my arrival in this district the weather conditions were unfavourable, as the rain then falling was accompanied by extremely cold winds. A fine spell set in early in the month, and harvesting operations were once again in full swing. Among the areas visited, some remarkably fine 17-months-old Badila was seen upon Mr. H. T. Stone's Daradgee farm. This land has not been under crop for a considerable time, and consists of a reddish to yellowish volcanic soil.

One of his paddocks is probably cutting at the rate of 55-60 tons of the acre, and in it is a Badila stool of twenty-six sticks showing nearly 8 feet of cane.

On Mr. C. McGowan's Daradgee farm some fine samples of cane of the newer varieties were seen.

Of these, H.Q. 458, E.K. 1, N.G. 16, and Q. 813 all show splendid growth for their age of 9 months. Mr. McGowan has gone to a great deal of trouble with his variety plant, and their vigorous growth reflects great credit upon him. In nearby paddocks consisting of heavier soils he is using both earth and burnt lime, and speaks well of the results.

Grubs have done very little damage to Daragee so far this year, but borers were noticed in several scattered places. On Upper Daradgee probably some 7,000 tons of cane from new land will be handled by the mill this year. The land was formerly growing bananas, and the higher portions of each farm consist of red volcanic, whilst some fine alluvial flats fronting the river form the balance. The ground has been stumped and is now under the plough. This group of farms looks particularly well, and some splendid Badila is being cut upon them.

Mourilyan.—The cane generally seems rather on the light side, the result, doubtless, of too much continuous wet last year, and the dry spell that was experienced during the growing months of the year. Not many grubs were noticed, but borers were fairly evident. A fair quantity of manure is being used in this particular district. Unfortunately the excessive cost of lime makes its use nearly prohibitive to farmers.

South Johnstone.—As in the surrounding districts, the crops generally were inclined to be on the light side, but in parts some fine cane was noticed, especially some of the red-soil farms.

On Mr. Callow's farm at Japoon some of the varieties from the Experiment Station were comparing more than favourably with the local canes. The varieties in point were E.K. 28, H. 109, and H.Q. 458. The latter looked extremely well in this particular soil (stiff clayey alluvial). Applications for new varieties to the Experiment Station are very numerous.

The most grub-affected part is the 17-mile. Here they have done a fair amount of damage on several farms, but unfortunately borers are much more in evidence all through the district than in any former year. As previously mentioned, the chief cane grown is Badila, and the borers have attacked standover, plants, and first ratoons most impartially, and have practically done the same amount of damage to cane grown on the clayey alluvial flats as to that upon the red volcanic soils. Again, it cannot be emphasised too strongly how very important it is to use none but perfectly healthy plants free from borers, when planting. Any grower who is careless in this respect is only courting trouble.

Lower Burdekin.—Owing to the very light fall of rain in March, April, and May, totalling 1.28 in., the prospects of a large crop for 1922 were unfortunately dispelled. At the end of June and early in July, rain totalling 2.69 inches fell, and prospects brightened. Fresh life was put into the growing crops, and a large area of land was got ready for an early planting.

The several mills, four in number, were in full swing. Quite a lot of building was in progress, and not many unemployed seemed to be about.

Kalamia.—Although a portion of the first cane sent in to this mill was very low in density, it is steadily improving. Some of the cane looks very well, notably some green Goru (24B) from Mr. C. Butterworth's irrigated farm. This should be cutting at the rate of about 45 tons to the acre. Unfortunately the grubs seem to be extending their operations considerably. Last year where they were only in one or two isolated patches on the south-eastern side of Plantation Creek, they have now covered a far larger area on that side, and also are to be seen upon the opposite side of the creek. Probably the recent very dry spell has enabled the grubs to do more damage than in an average season. So far very few borers have been observed.

Pioneer.—As in most of the local mills a fair proportion of the early-cut cane sent in to Pioneer was very low in density, but at time of writing it is improving considerably. Some good-looking cane is going through the rollers, namely B. 208, Red and Green Goru, and Badila. All through the Pioneer area a lot of land is being prepared for planting, and in several places some really good young plant cane was seen, notably at Dick's Bank, upon Mr. J. N. Pringle's farm.

At the Lower Burdekin Show the cane exhibits were remarkably fine. An interesting feature of the cane section was a total of twenty-four varieties of cane shown by Mr. Jas. Mackersie, in his very fine one-man farm exhibit.

"In the c.c.s. tests the awards were—

Owner.	Variety.	C.C.S. Weight of Cane (3 Sticks.)		Pounds c.c.s. in Cane.	Place.
BADILA, H.Q 426, or B 208.					
Todd Bros. 	Badila ..	15.8	28 lb.	4.42	First
Pringle, J. N. 	B. 208 ..	17.8	23 ,,	4.09	Second
OTHER VARIETIES.					
Todd Bros. 	H.Q. 458 ..	1.32	38 lb.	5.01	First
Wellington, H. A. 	M. 1900 ..	13.6	28 ,,	3.80	Second

Home Hill.—The distribution of plants from the experimental plot on the State Farm was carried out on the 26th instant. The varieties most asked for were M.Q. 1 (Mowbray Seedling), Hybrid No. 1, E.K. 28, and H. 109, whilst Q. 813, Q. 970, and Q. 903, 7 R. 428, and NG. 103 were wanted in smaller quantities. A very big demand for Tableland Badila is also being supplied from the station, the growers in this locality favouring this variety.

Giru (Haughton Valley).—A day was spent in this prosperous little centre, and it was quite noticeable how much it had gone ahead since my last visit. Unfortunately, having no irrigation system, it has suffered severely from the recent dry spell, the rainfall to date being as follows:—

January	..	..	..	6.99
February	..	..	..	17.19
March	..	..	..	2.75
April	..	..	..	.35
May	..	..	..	.23
June	..	..	..	.66
July	..	..	..	2.02

30.19

Grubs are also much more numerous and more scattered than last year.

The growers who have used arsenic are still of the opinion that its use is beneficial. The most consistent advocate of its use is Mr. R. Wight. It will be remembered that in cane planted in 1920 he used poison at the rate of 40 lb. to the acre. Subsequently he cut a 38-ton crop off this block, although his other cane was badly grub-affected. He is now planting, and after covering the plant with a little soil, adds a dressing at the rate of 65 lb. of arsenic to the acre and then fills in the remainder of the soil. As all the farms here are unirrigated the grubs soon make their presence known in a dry season like the present. In the opinion of competent authorities, it would be advisable to form a pest fund for collecting beetles and grubs in any of the places that are suffering from such a pest, as although undoubtedly expensive, it certainly keeps the damage down. Several tractors were noticed at work in this area. The mill is said to be doing very good work, and although the density has been low, just now it is improving. A good area of young plant cane was observed, but, generally speaking, it was striking very slowly.

CANE PEST COMBAT AND CONTROL.

The following report (dated 15th August, 1922) has been received by the Director of Sugar Experiment Stations from the Entomologist (Mr. E. Jarvis) at Meringa, near Cairns:—

VISIT TO SOUTH JOHNSTONE.

A trip was made to this district on the 17th instant, with the objects of (1) investigating certain diseases of cane reported as occurring in the vicinity of the Johnstone River; (2) studying the insect pests of cane; and (3) fixing on suitable spots for liberation in the near future of tachinid fly parasites to combat the weevil-borer *Rhabdocnemis obscurus* Boisd., which on some plantations is doing a lot of damage.

On the whole the cane at South Johnstone was found to be particularly free from fungus or bacterial diseases, which have at times during prolonged wet weather occasioned serious losses in the Burdekin and other sugar centres.

Badila appear to be the variety mostly grown here; and certainly thrives luxuriously on the best classes of red soil.

The cane inspector (Mr. McCartney) drew my attention, for instance, to a block of plant Badila on which many stools carried from fifteen to nineteen sticks, 6 to 8 feet in length, and from $1\frac{1}{2}$ to 2 inches thick. I desire to thank Mr. James Cran, Mr. P. H. McWalters, and Mr. A. C. Brackenburg for assistance rendered during my visit.

The following cane affections were noticed; all of them being of minor economic importance:—

(1) *Form of Dead Heart*.—About 5 per cent. of the cane on a small block of Badila planted last August was affected by a curious disease characterised by death or non-development of the central shoot, followed by an abnormal growth of the top buds, which varied from 6 to 12 inches in length. The inner surface of the upper leaf-sheaths was intensely red, although the leaves, for the most part, were of normal appearance. In some cases the central core yielded to a slight pull, when the basal portion was seen to be decayed and malodorous. Longitudinal sections of canes showed central discolouration of the terminal portion, but no gumming of any kind, and the rotting base of the dead heart, which was often situated 2 inches or more above the top core of the stick, presented the appearance of having in the first instance been broken transversely as a result of mechanical injury of some kind. A hollow space of an inch or more sometimes occurred behind this decayed end, while the lower portion of the dead heart, although not in any way decomposed, showed irregular patches and lines of red when sectioned lengthwise. It was noticed that one of the internodes, about 9 inches from the top of canes having this disease, was shorter than those immediately above and below it—an indication, perhaps, that growth had been checked at that particular point. A transverse section through this short internode revealed the presence of a decayed, brownish-yellow, core-like spot, or small cavity, about 4 mm. in diameter, with paler suffused margins, situated near the centre of the stalk, and extending about 1 inch in a longitudinal direction. In some cases the surrounding vascular bundles were also discoloured, appearing as watery yellowish-brown spots in cross-section. Possibly the central shoot may have been affected at this stage of growth, and resulted in a gradual development of dead heart later on. No indications of the occurrence either of moth-borers or leaf-eating insects were noticed. Examination of some of the diseased tissue taken from the decayed core occurring in the short internode showed that bacteria were absent.

(2) *Cane Rust* (*Uredo Kuhnii*) occurred in places, but very sparingly.

(3) *Eye Spot Disease* (*Cerospora sacchari*) associated with plants having dead hearts, but was not an invariable accompaniment of this affection, and occurred mostly on the older leaves.

(4) *Red Rot* (*Colletotrichum falcatum*).—Canes exhibiting this well-known disease were observable on some of the trucks. Fortunately injuries due to this fungus can be reduced to a minimum if care be taken to reject when planting any sets showing red discolouration at the cut ends.

(5) *Bunchy-top*.—A few isolated examples of this curious abnormal development of the upper leaves were observed among stools of Badila cane.

CANE BORER AT SOUTH JOHNSTONE.

The weevil-borer *Rhabdocnemis obscurus* Boisd. is causing much damage on some of the cane lands at South Johnstone, and during my visit to the district suitable spots for liberation in the near future of the tachinid fly parasite *Ceromasia sphenophori* were selected. It is hoped that the activities of this parasite may ultimately relieve the situation, although it is, of course, within the bounds of possibility that natural enemies or climatic influences may prove serious obstacles to its successful establishment. Long-continued damp conditions induced by the heavy rainfall might, for instance, enable the entomogenous fungus (*Empusa* sp.) to flourish through the wetter months of the year, in which case it would be likely to operate as a severe check on the increase of these useful parasites. The various species of 'jumping spiders,' and the ever-present black ant *Pheidole megacephala*, found commonly in our cane fields, will doubtless destroy a certain percentage of the flies, but losses from attacks of insect enemies are usually of minor importance compared to those brought about by vegetable parasites. However, we naturally hope for the best, and it may easily happen that the tachinid flies, after liberation, will spread rapidly and do good control work.

BACTERIAL DISEASES OF GRUBS.

On 12th June three grubs exhibiting a pinkish discoloration were collected from cane furrows at Meringa and kept under observation. Eleven days later one of these had developed a bacterial disease (B2), the internal organs of the grub having for the most part disappeared and been replaced by a blackish fluid. When held against a strong light the abdominal regions of the body were seen to be partially hollow, and the skin slightly distended by the action of internal gasses. Smears taken from this grub swarmed with motile rod-shaped bacteria, occurring generally in pairs, but often in chains of from three to five. Attempts to infect healthy grubs with this bacillus have not, so far, proved successful.

Grubs attacked by another form of bacterial disease (B3) (*Coccobacillus* sp. (?)) the symptoms of which resembled those produced by *Coccobacillus nigrofasciens*, were obtained this month, smears taken and cultures made, slices of potato being used as a medium. Healthy grubs inoculated with this disease developed all the characteristic external signs of blackening around the spiracles after twenty-four hours, and succumbed within three to five days. The rod-shaped organism responsible for this disease differs from that of the preceding (B2) in being proportionately longer and occurring almost invariably in pairs. Grubs affected by it emit an exceedingly offensive odour.

A third cane-grub, displaying dull red patches on the sides of the body, and which had apparently died of some bacterial malady, was found upon examination to harbour multitudes of the *Coccobacillus* No. (B3), and another species, *Micrococcus* sp. (?) (B7). Colonies formed by the latter on slices of potato were of a decided red colour, while those derived from (B3) were creamy-yellow. Healthy grubs inoculated with the red bacillus (B7) remained normal, but Mr. Cottrell-Dormer, Assistant Entomologist, discovered that when they were inoculated with the two bacilli, mixed together in water, the virulence and activity of the *Coccobacillus* (B3) was greatly increased, and that grubs so treated died in about twenty-four hours.

We hope to find some simple and practical method of infecting cane-grubs with some suitable bacterial disease. This interesting phase of grub control has hitherto received little or no attention in Queensland, but nevertheless presents possibilities which should not be overlooked.

SOIL FUMIGANT FOR GRUBS.

Laboratory and preliminary field experiments with a certain soil fumigant gave very encouraging results, and a special report was published on same.

AN EFFICIENT SOIL-FUMIGANT FOR CANE GRUBS.

The following special report (dated 11th August, 1922) has been received from the Entomologist at Meringa (Mr. Edmund Jarvis) by the Director of the Bureau of Sugar Experiment Stations:—

In recent reports mention has been made from time to time of experimentation in connection with fumigants suitable for injection in a dry form, the ideal aimed at being discovery, if possible, of some substance that can be easily applied during the course of cultural operations, which is harmless to handle, and which possesses deterrent or killing properties of an enduring nature.

Many promising substances have been investigated here during the past six months, comprising various pungent oils and certain deadly poisons. The latter were combined in some cases with suitable chemical compounds in order that they might be handled with safety during field operations.

Several of these preparations yielded excellent results against caged grubs in our insectary, but when tested in the open did not altogether realise expectations. Nevertheless, some of them are considered good enough to warrant further study, and we hope to ultimately devise satisfactory methods of applying these deterrents in the field.

You will, however, be interested to learn that recent experiments here with a fumigant—the properties of which were first investigated by the writer seven years ago, whilst at Gordonvale (see "Queensland Agricultural Journal," June, 1915, p. 262) have given the best results so far obtained, both in laboratory and field work.

This substance, which is one of the halogen derivatives, known commercially as dichlorbenzole (para-dichlorobenzene), is said to be obtained by passing chlorine into benzene containing iodine or molybdenum pentachloride until a sample of the resultant fluid will partly crystallise on cooling.

The ultimate chemical derived, after washing and distillation, takes the form of irregular semi-transparent crystalline nodules of somewhat oily appearance, possessing a penetrating but not unpleasant odour very like that of ordinary benzene.

INITIAL EXPERIMENTATION.

As a preliminary test at Gordonvale laboratory in 1915, six grubs were confined in a cage holding 54 cubic inches of sifted soil, with which had been mixed 15 grains of the deterrent (1 oz. to 1 cubic foot). After two and a-half days all larvæ were dead and partially rotten. This experiment was repeated on three subsequent occasions, with similar results. Eighteen large grubs were then placed in an open cage containing 1 cubic foot of unsifted soil, infected with $\frac{1}{2}$ oz. of coarsely crushed dichlorbenzole; and thirty-six hours later three had succumbed and the remainder were lying motionless as though paralysed, all dying in less than a fortnight. Tests were then applied to determine the effect on larvæ of isolated injections of the chemical in crushed form administered at various depths, and these trials proving satisfactory, it was decided to experiment in the open. A plot of ground was accordingly prepared on 3rd April, 1915, by being dug 9 inches deep, allowed to settle for a few days, and treated with a single line of $\frac{1}{4}$ oz. injections placed 1 foot apart, and 5 inches below the surface. Grubs of the grey-back cane-beetle were then buried in the soil at various distances from the chemical, each larva being confined in a specially designed cage, that whilst preventing extended movement in a horizontal direction allowed it to descend vertically to a depth of 9 inches or to ascend to within 1 inch of the surface, and at the same time ensured continuous natural conditions with respect to drainage, moisture, temperature, &c. Examined on the 12th instant (nine days later), the soil was found more or less impregnated with the odour of the deterrent to a distance of 1 foot on each side of injections. Larvæ placed at distances of 6 to 8 inches were dead and partially decomposed, those at 9 inches, dying, but able to move convulsively, and those 1 foot away alive and apparently normal. Grubs situated 9 inches from the chemical succumbed on the 18th instant (after fifteen days), whilst those 1 foot distant, and control specimens, continued unaffected throughout the experiment.

This test was repeated later, with practically identical results, and further trials, in which the injections were reduced to 80 grains, placed 1 foot 6 inches apart, also proved satisfactory.

Experiments conducted at Meringa last April in a field of first ratoons of D. 1135 proved just as successful as those carried out by the writer in 1915. Four stools were treated with doses varying from 2 to 8 scruples, placed 5 inches below the surface, and 2 to 5 inches from the cane sticks. When examined a week later all grubs within about 8 inches of the chemical were dead, while the odour had strongly impregnated the soil to a distance of about 9 inches on all sides of the 4 to 6 scruple injections. During the preceding fortnight the weather had been dry, but two days before making the experiment 0.06 inches of rain fell, and during the course of the experiment 0.12 inches. The soil was fairly damp throughout the week.

RATE OF EVAPORATION.

With reference to the rate of evaporation of dichlorbenzole, I observed that in dry weather, a quarter of an ounce (left fifteen days underground at a depth of 7 inches during an average temperature of 69 degrees Fahr.) lost nearly half its weight, but did not actually disappear until the end of six weeks. Under wet conditions both evaporation and soil infection were retarded.

Investigations being conducted at the present time in very damp closely packed soil, in a field of first ratoons, have shown that injections of 4 drachms lost half a drachm during a period of eighteen days, from which we may gather that under such conditions evaporation would continue during a space of about four months.

It is worth noting, however, that the deterrent odour remains in the ground long after all traces of its origin have vanished.

Soil under cane stools treated 5th March, 1915, was found strongly infected on 8th May, three weeks after complete evaporation, from which we may reasonably assume that a limited area of such contaminated soil—comprising, say, a strip at least a foot wide—would continue repellent until the odour became less decided.

METHODS OF APPLICATION.

Dichlorbenzole would prove an ideal fumigant for plant cane, as it could simply be put in the furrows with sets when planting, and if applied during November or December the odour would have ample time to penetrate and render the soil on each side of stools distasteful to the beetles and deter them from ovipositing in ground thus contaminated.

In the event of eggs being deposited near the plants, this fumigant would certainly kill any grubs that might hatch from them.

In seasons when it is possible to plant very early, a crop could be assured by using dichlorbenzole, even though the cane were planted on an area infested by grubs, at a time of year when they were doing their worst damage. The fumigant, however, would prevent them from touching the sets, and not only kill all that happened to occur in the immediate vicinity, but also protect the soil from further invasion until grubs had ceased feeding and all danger was over.

For application to ratoon crops the chemical could either be injected in the form of balls of the desired weight, or these be dropped at suitable intervals in a furrow made close against the line of stools to be treated. The best time for such application would be during December or January, before the cane got too high, the result being that all first and second stage grubs arising from eggs deposited in November and December would be killed before they were able to work appreciable damage.

COST OF APPLICATION.

During 1915 the price of dichlorbenzole was stated to be about 6d. per lb., but owing to its being manufactured only in Germany it was not easily procurable during the late war.

On the 16th of last June, however, I wrote to Berlin, inquiring the present price in bulk quantity, &c., and ordering enough of the chemical to enable us to carry out a field demonstration during the coming grub season.

Assuming the price to be 6d. per lb., it would cost less than £2 to treat one acre of cane with $\frac{1}{4}$ -oz. injections, but this is a matter which will need to be determined later.

Unlike arsenical and other poisonous preparations, dichlorbenzole possesses the great advantage of being harmless and clean to handle, while the odour arising from it is not in any way objectionable.

In no instance has experimentation with this fumigant been followed by noticeable injury to the growing cane plants. Sets of Badila planted immediately over injections made in open ground at the laboratory have rooted in the contaminated soil, and at the present time the growth above ground appears quite normal.

Apropos of the foregoing, the Agricultural Chemist (Mr. J. C. Brünnich) comments as follows:—

About 30 years ago I had good results in the Mackay district by fumigation of the cane stools in the field with bisulphate of carbon for the destruction of cane grubs. I at once saw the possibilities of using this new chemical for the same purpose, as it has great advantages over the former. Bisulphide of carbon (commercial) has a very disagreeable smell, is highly inflammable, evaporates very rapidly, and its vapours form explosive mixtures with air. Dichlorobenzene (para) has a not-unpleasant aromatic odour, is absolutely non-inflammable, evaporates very slowly, and is also practically non-poisonous to man.

I wrote to the "Agfa" company, mentioning the probable extensive use of the chemical for the killing of cane grubs, and, although, according to a notice printed on the labels, the export of this chemical to foreign countries was not permitted, they sent me two 7-lb. tins, free of charge, for experimenting, which were landed here just about the time war broke out. One of these tins I handed to Mr. Easterby, the Superintendent of Sugar Experiment Stations, and Mr. Jarvis, under his direction, made the first experiments, reported in June, 1915.

The present price of the pure chemical is 3s. per lb., but I have no doubt that a cruder product would be quite as efficient, and should be produced at greatly reduced cost. This chemical is invaluable for the destruction of moths, silverfish, and weevils in grain in confined spaces, and for the latter purpose it has the advantage over bisulphide of carbon, which hitherto was the only efficient remedy against grain weevils, that it does not appear to injure the germinating power of the seeds so treated. Experiments to prove this fact have been in progress for some considerable time at the seed laboratory. The odour of the chemical is very persistent, and if grain fumigated with it is fed to fowls, the eggs have a distinct flavour of the chemical.

OIL FROM SHALE.

In various parts of the world, including Australia, there are deposits of shale from which it is possible to distil oil on a commercial basis. An improvement on the usual process has just been introduced by a British engineer. The shale is powdered and heated until it is just about to give off vapour. It is then mixed in a retort with hot sand, which thus raises it to the temperature required for complete carbonisation, but does not raise it beyond the point at which all the volatile constituents will be distilled off. Tests made of this process show that no clinkering of the material takes place.

A SUMMARY OF SOME EXPERIMENTS CARRIED OUT BY THE BUREAU OF SUGAR EXPERIMENT STATIONS.—IV.

BY H. T. EASTERBY, Director.

The first article of this series, in the course of which Mr. Easterby discussed deep cultivation experiments and tabulated comparative crop results from subsoiled and non-subsoiled fields, was published in the May journal. The second instalment was an account of the results of irrigation experiments and the action of irrigation and manures upon the density and purity of sugar juices, and appeared in the June issue. The third instalment, treating of experiments in fertilisation, appeared in the August journal.—Ed.

In 1905 experiments for determining the most suitable distances between the plants in the row and the widths of the cane rows were laid down. These comprised ten separate plots, and were as under:—

Date of Planting.			Variety Used.			Width between the Rows.	Width between the Plants in the Row. (Three eyes to each plant.)
April, 1905	..	..	N.G. 40	..	..	5 feet	Continuous cane
April, 1905	..	..	ditto	..	..	5 feet	6 inches
April, 1905	..	..	ditto	..	..	5 feet	12 inches
April, 1905	..	..	ditto	..	..	5 feet	18 inches
April, 1905	..	..	ditto	..	..	5 feet	24 inches
April, 1905	..	..	ditto	..	..	5 feet	36 inches
April, 1905	..	..	N.G. 24A	..	..	4 feet	6 inches
April, 1905	..	..	ditto	..	..	5 feet	6 inches
April, 1905	..	..	ditto	..	..	6 feet	6 inches
April, 1905	..	..	ditto	..	..	7 feet	6 inches

Before furnishing the analytical data and crop results from these experiments, two tables are given which set forth the number of plants per acre, the number of eyes per acre, and the weight of seed per acre, in the two series of tests now under discussion. The first series deals with the number of plants in the row, the distance between the rows in this series being uniformly 5 feet; and under the heading of "Weight of seed used per acre" it is seen that, while one continuous stick in the row used $2\frac{1}{2}$ tons of seed per acre, the other extreme of 36 inches between the plants in the row used only half a ton of seed per acre. In the second series it is also shown that a distance between the rows of 4 feet used 1 ton 18 cwt. of seed per acre, while the distance of 7 feet between the rows used 1 ton 2 cwt. per acre. These data require to be kept in mind when the crop results are dealt with in a later place.

DISTANCE EXPERIMENTS.

CANE PLANTS USED PER ACRE.

FIRST SERIES.

Distance between the Plants.			Number of Plants per Acre.	Number of Eyes per Acre.	Weight of Seed used per Acre.
					Tons cwt.
1. Continuous stick in the row	..	..	Continuous stick	34,848	2 10
2. Plants 6 inches apart	..	..	6,969	20,907	1 10
3. Plants 12 inches apart	..	..	4,976	14,927	1 2
4. Plants 18 inches apart	..	..	3,867	11,601	0 16
5. Plants 24 inches apart	..	..	3,168	9,504	0 14
6. Plants 36 inches apart	..	..	2,323	6,969	0 10

SECOND SERIES.

Distance between the Rows.				No. of Plants per Acre.	No. of Eyes per Acre.	Weight of Seed used per Acre.
						Tons cwt.
1. 4 feet apart	..	..	..	8,712	26,136	1 18
2. 5 feet apart	..	..	..	6,969	20,907	1 10
3. 6 feet apart	..	..	..	5,808	17,424	1 4
4. 7 feet apart	..	..	..	4,978	14,934	1 2

The plant crop of the above experiment was harvested in September, 1906. The analytical data is given below:—

ANALYSES OF PLANT CANE IN THE DISTANCE EXPERIMENTS,
SEPTEMBER, 1906.

FIRST SERIES.

Variety of Cane.	Distance between the Plots.	Date of Analysis.	Age of Cane.	Density of Juice (l ri).	Sucrose in Juice.	Glucose in Juice.	Purity of Juice.	Fibre in Cane.	Sucrose in Cane.
N. Guinea 40 ..	Continuous stick in the row	27-9-06	17 mths.	16.6	15.03	.67	90.5	10.16	13.50
N. Guinea 40 ..	Plants 6 inches apart	27-9-06	ditto ..	16.5	14.74	.68	89.3	11.29	13.07
N. Guinea 40 ..	Plants 12 inches apart	27-9-06	ditto ..	17.0	15.62	.62	91.8	10.59	13.96
N. Guinea 40 ..	Plants 18 inches apart	27-9-06	ditto ..	18.2	16.97	.46	93.2	10.57	15.17
N. Guinea 40 ..	Plants 24 inches apart	27-9-06	ditto ..	17.0	15.16	.78	89.1	9.86	13.66
N. Guinea 40 ..	Plants 36 inches apart	27-9-06	ditto ..	19.0	17.59	.47	92.5	10.74	15.70

SECOND SERIES.

Variety of Cane.	Distance between the Rows.	Date of Analysis.	Age of Cane.	Density of Juice (Brx).	Sucrose in Juice.	Glucose in Juice.	Purity of Juice.	Fibre in Cane.	Sucrose in Cane.
N. Guinea 24A	4 feet	27-9-06	17 mths.	18.7	16.88	.57	90.2	10.41	15.12
N. Guinea 24A	5 feet	27-9-06	ditto ..	19.5	18.30	.36	93.8	10.25	16.42
N. Guinea 24A	6 feet	27-9-06	ditto ..	19.3	18.00	.37	93.2	10.30	16.14
N. Guinea 24A	7 feet	27-9-06	ditto ..	19.6	18.27	.41	93.2	10.04	16.43

Before discussing the actual crop results, attention is called to the analytical data furnished in the analyses of the two series. In the analyses of the first series it is noted that there is an increased density, on the whole, in the canes that were planted the greater distance apart in the rows. For example, the density of the juice from the "continuous stick" plot was 16.6 Brix., while the density from the plot where the plants were 36 inches apart in the row was 19.0 Brix. The density, however, is not strictly progressive with the distance apart between the plants in the row. Special reference is made to the following matter:—The cane in these experiments was seventeen months old when cut; this is known as a "long crop." This age of the crop allowed time for all the younger canes resulting from the suckers to reach maturity, and this enabled a higher density and purity to be obtained. This was facilitated by the greater distance between the stools or plants in the row, permitting the sunlight, which is the chief maturing agent, to effect its work. Thick standing crops, particularly if they are heavy enough to go down and lie upon the ground, thus excluding to a greater extent the air and the sun, are very generally lower in density and purity of the juice. Soils, however, have also some influence in this respect.

The analytical data in the second series tend to confirm the observations that have been made relating to the first series. It is noted that the density and purity of the juice from the cane planted in rows 4 feet apart are the lowest, while the density and purity from the rows planted 7 feet apart are the highest, although the difference in quality between the different plantings is not very high.

The crop results from the two series were as follows:—

CROP RESULTS OF THE DISTANCE EXPERIMENTS, PLANT CANE, 1906.

FIRST SERIES.

Distance between the Plants in the Row.	Name of Variety.	Age of Cane.	Number of Canes per Acre.	Average Weight of the Sticks in lbs.	Weight of Cane per Acre in English tons.	Yield of Sugar per Acre in English tons.
1. Continuous stick in the row	N.G. 40..	17 mths.	28,749	4.3	56.4	7.6
2. Plants 6 inches apart	N.G. 40..	ditto ..	32,016	3.8	55.7	7.2
3. Plants 12 inches apart	N.G. 40..	ditto ..	30,927	3.7	51.4	7.1
4. Plants 18 inches apart	N.G. 40..	ditto ..	33,105	3.3	49.5	7.5
5. Plants 24 inches apart	N.G. 40..	ditto ..	32,670	3.4	50.2	6.8
6. Plants 36 inches apart	N.G. 40..	ditto ..	33,541	3.0	44.9	7.0

SECOND SERIES.

Distance between the Rows.	Name of Variety.	Age of Cane.	Number of Canes per Acre.	Average Weight of the Sticks in lbs.	Weight of Cane per Acre in English tons.	Yield of Sugar per Acre in English tons.
1. 4 feet apart ..	N.G. 24A	17 mths.	24,502	6.8	75.3	11.3
2. 5 feet apart ..	N.G. 24A	ditto ..	24,393	5.8	63.5	10.4
3. 6 feet apart ..	N.G. 24A	ditto ..	25,591	5.1	58.8	9.4
4. 7 feet apart ..	N.G. 24A	ditto ..	24,734	4.9	55.1	9.0

In discussing the actual crop results of these experiments, very noteworthy observations have to be made.

In the first series it is shown that one continuous stick planted in the row, also the plants only 6 inches apart in the row, gave over 11 tons of cane per acre more than where the plants were placed 36 inches apart in the row. Yet, when reference

is carried back to the table showing the amount of seed used per acre in planting, these results show that for the extra 2 tons of cane used per acre in planting an additional 11 tons of cane per acre were obtained as the crop result.

In the crop results of the second series, the first startling result is that the cane from the rows planted 4 feet apart gave 20 tons per acre more cane than was obtained from the rows 7 feet apart, and it is noted that the gradation is regular and progressive along the line of the different widths between the rows which the experiments represented. It is not only in the weight of cane per acre but also in the yield of sugar per acre that it is shown that the thicker planting has given such notably bigger results; the cane from the rows 4 feet apart yielded $11\frac{1}{2}$ tons of sugar per acre, while the cane from the rows 7 feet apart yielded 9 tons of sugar per acre, or $2\frac{1}{2}$ tons per acre less.

The differences in the results between the first series and the second series are very noteworthy. The data set forth indicate that the variation in difference between the rows has a much more definite bearing upon the crop results than the variation in distance between the plants in the row.

The different nature of soils and differences in climatic conditions can also have an influence upon the settlement of this question. For example, in the Northern districts, with heavy rainfalls and moist conditions, the small distance between the rows may not be so advisable. Again, in the south, where droughts can be long and furious, a small distance between the rows can quickly exhaust the moisture content of the soil, so that the crop cannot reach anything like maturity; while, if the rows were 6 feet apart, the moisture content may be enough to bring a lower weight of cane to a condition fit for cutting. As an illustration of this it may be stated, in connection with the maize crop, that when a drought has been imminent and actually coming on, farmers have been advised to cut out every other row so that the remaining row could get the advantage of the total moisture in the soil, and this has resulted in bringing a half-crop to maturity; whereas had the whole crop remained upon the ground not an ear of corn would have been formed on any of it. These facts show how many and how intricate are the conditions and factors which relate to the question of planting. In the Mackay district specially, where these experiments were carried out and where the soil conditions and rainfall are relatively uniform and favourable to the cane crop, there is no doubt that a very reliable guidance will be found in the results of the experiments.

In leaving the discussion of the planting experiments, as set forth in the tables of the first and second series, it must be explained that two varieties of cane were used. In the first series, New Guinea No. 40 was used in the tests; in the second series, variety New Guinea No. 24A was used. The latter variety is very superior, both as a cropper and as a sugar yielder, to the New Guinea No. 40, and the behaviour of the two varieties in these distance experiments corresponds almost exactly to their behaviour in all other experiments in which they have been used.

It is not proposed to give the results of the first, second, and third ratoon crops separately, but to total them with the plant crops. The results of the ratoon crops followed very closely those of the plant crop.

The total results of these experiments now follow:—

TOTAL RESULTS OF THE DISTANCE EXPERIMENTS: COVERING PLANT, FIRST, SECOND, AND THIRD RATOON CROPS, 1906-1909.

FIRST SERIES.

Distance between the Plants in the Row.	Name of Variety.	Total Cane per Acre, English Tons (4 crops).	Total Sugar per Acre in Pounds (4 crops).	Total Sugar per Acre, English tons (4 crops).
1. Continuous stick in the row	N.G. 40 ..	201.6	63,113	28.1
2. Plants 6 inches apart ..	N.G. 40 ..	198.8	62,214	27.7
3. Plants 12 inches apart ..	N.G. 40 ..	186.2	58,328	26.0
4. Plants 18 inches apart ..	N.G. 40 ..	166.0	56,619	25.2
5. Plants 24 inches apart ..	N.G. 40 ..	177.7	57,157	25.5
6. Plants 36 inches apart ..	N.G. 40 ..	152.1	51,285	22.8

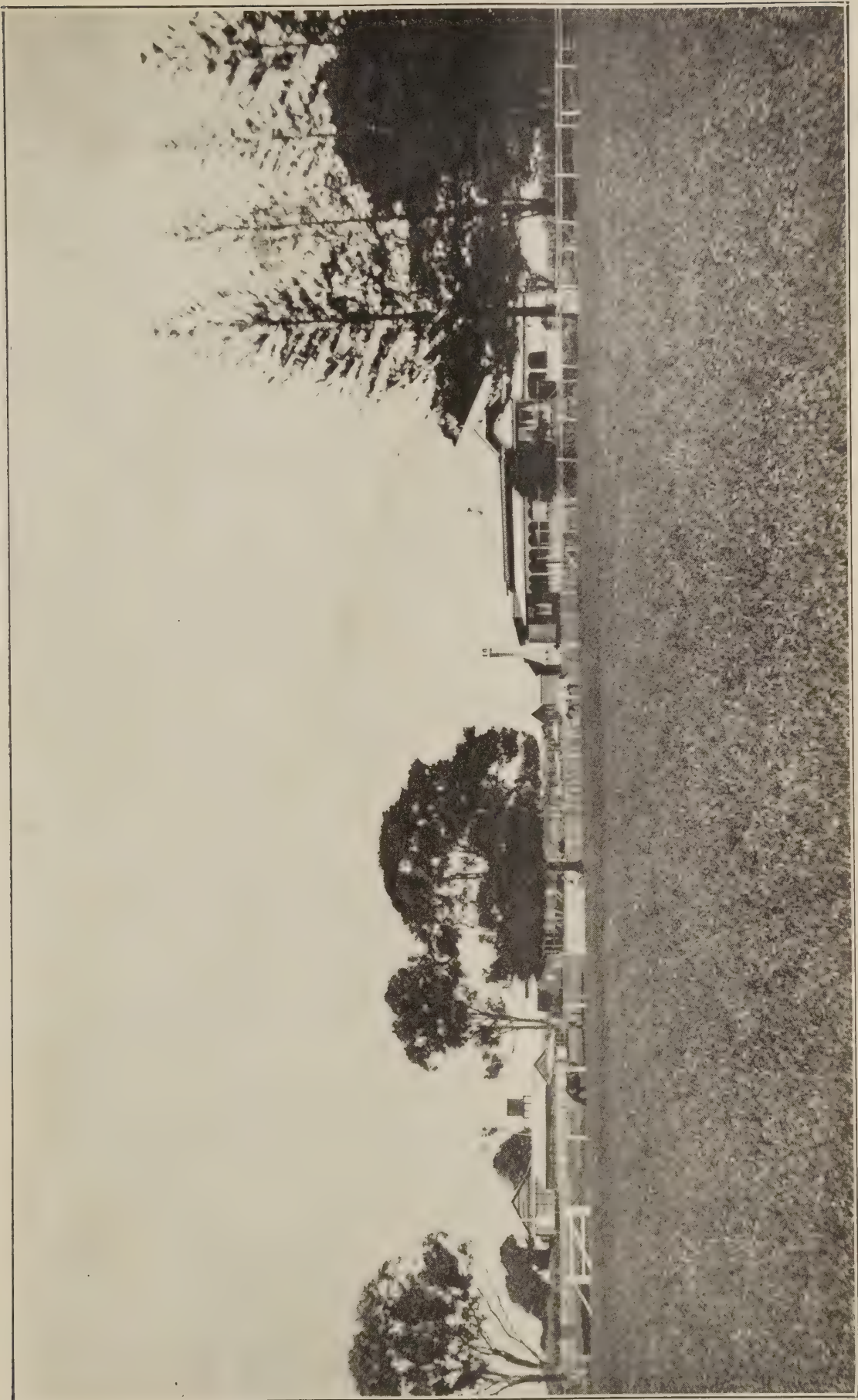


PLATE 16.—SUGAR EXPERIMENT STATION, BUNDABERG.

Photo : Dept. Agriculture and Stock.]

SECOND SERIES.

Distance between the Rows.	Name of Variety.	Total Cane per Acre, English tons (4 crops).	Total Sugar per Acre in Pounds (4 crops).	Total Sugar per Acre, English tons (4 cr. ps).
1. 4 feet apart	N.G. 24A ..	246.2	86,392	38.5
2. 5 feet apart	N.G. 26A ..	208.4	75,514	33.6
3. 6 feet apart	N.G. 24A ..	190.8	65,447	29.1
4. 7 feet apart	N.G. 24A ..	181.0	64,452	28.7

SUMMARY.

From this table final and definite conclusions must be made, and the advantage to be derived from wide and narrow planting, and using more or less seed per acre, will be found. Commencing by taking the first series, we find that the total cane and sugar per acre produced by the four crops shows us that the plot in which the sets were placed continuously in rows 5 feet apart has produced—

First.—An increase above the yield from plants placed 6 inches apart in the row amounting to 2 8/10 tons of cane and 8 cwt. of sugar per acre, for an expenditure of 20 cwt. more seed per acre;

Second.—An increase above the yield from plants placed 12 inches apart in the row amounting to 15 4/10 tons of cane and 2 1/10 tons of sugar per acre, for an expenditure of 28 cwt. more seed per acre;

Third.—An increase above the yield from plants placed 18 inches apart in the row amounting to 35 6/10 tons of cane and 2 9/10 tons of sugar per acre, for an expenditure of 34 cwt. more seed per acre;

Fourth.—An increase above the yield from plants placed 24 inches apart in the row amounting to 23 9/10 tons of cane and 2 6/10 tons of sugar per acre, for an expenditure of 36 cwt. more seed per acre; and

Fifth.—An increase above the yield from plants placed 36 inches apart in the row amounting to 49½ tons of cane and 5 3/10 tons of sugar per acre, for an expenditure of 40 cwt. more seed per acre.

Note.—All rows in above series were 5 feet apart.

This series was somewhat upset by the irregular behaviour of Plot No. 4, where the plants were placed 18 inches apart. This was thought to be due to the depredations of pests. In other respects the results are very conclusive.

When we consider the results from the second series, it must be remembered that a superior variety of cane was here used. This series has from the beginning given more uniform and striking results. The total crop yields from the plant and three ratoons may be summarised as follows:—

The cane planted in rows 4 feet apart has produced:—

First.—An increase above the yield from the cane planted in rows 5 feet apart amounting to 37 8/10 tons of cane and 4 9/10 tons of sugar per acre, for an expenditure of 8 cwt. more seed per acre;

Second.—An increase above the yield from cane planted in rows 6 feet apart amounting to 55 4/10 tons of cane and 9 4/10 tons of sugar per acre, for an expenditure of 14 cwt. more seed per acre; and

Third.—An increase above the yield from cane planted in rows 7 feet apart amounting to 65 2/10 tons of cane and 9 8/10 tons of sugar per acre, for an expenditure of 16 cwt. more seed per acre.

It is therefore evident, on comparing the two series, that the variation in distance between the rows has a far more important bearing on the yield than the variation of the plants in the rows, while at the same time the expenditure of seed is not nearly so large.

The conclusions which may be safely drawn from these experiments at Mackay are, therefore:—

First.—Plants with three eyes, placed 6 inches apart in the row, or even closer, is found to be the best method of planting the sets in the row.

Second.—Any increase in distance between the rows exceeding 5 feet is likely to result in a low weight of cane and yield of sugar per acre, while 4 feet between the rows has been found to result in a considerable increase both of cane and sugar.

It must, however, be carefully borne in mind that these experiments must be considered as applicable only to the Mackay district in normal years. In the North, with its heavy rainfalls and moist, humid conditions, thick planting may not be at all advisable, while south of Mackay, where droughts are not uncommon, a wider distance, providing more moisture for the cane, may be imperative.

RAINFALL IN THE AGRICULTURAL DISTRICTS.

TABLE SHOWING THE AVERAGE RAINFALL FOR THE MONTH OF JULY IN THE AGRICULTURAL DISTRICTS, TOGETHER WITH TOTAL RAINFALLS DURING JULY 1922, AND 1921, FOR COMPARISON.

Divisions and Stations.	AVERAGE RAINFALL.		TOTAL RAINFALL.		Divisions and Stations.	AVERAGE RAINFALL.		TOTAL RAINFALL.	
	July.	No. of Years' Records.	July, 1922.	July, 1921.		July.	No. of Years' Records.	July, 1922.	July, 1921.
<i>North Coast.</i>					<i>South Coast—continued:</i>				
	In.		In.	In.		In.		In.	In.
Atherton	0·90	21	2·24	1·24	Nambour	2·72	26	3·45	6·66
Cairns	1·61	40	2·50	1·64	Nanango	1·77	40	2·53	3·52
Cardwell	1·46	50	2·05	2·49	Rockhampton ...	1·50	35	3·20	5·81
Cooktown	1·00	46	0·55	1·19	Woodford	2·52	35	2·66	5·37
Herberton	0·69	35	2·21	2·40					
Ingham	1·64	30	2·20	3·64	<i>Darling Downs.</i>				
Innisfail	4·77	41	3·55	7·33	Dalby	1·82	52	1·81	3·30
Mossman	1·54	14	2·34	1·28	Emu Vale	1·60	26	2·50	5·77
Townsville	0·58	51	1·48	3·45	Jimbour	1·71	34	1·67	2·04
<i>Central Coast.</i>					Miles	1·80	37	0·95	2·25
Ayr	0·68	35	2·10	5·68	Stanthorpe	2·06	49	3·30	8·07
Bowen	0·95	51	2·40	2·77	Toowoomba	2·06	50	3·55	5·33
Charters Towers ...	0·59	40	3·99	2·85	Warwick	1·83	57	3·08	6·32
Mackay	1·70	51	4·66	7·19					
Proserpine	1·41	19	2·50	8·08	<i>Maranoa.</i>				
St. Lawrence	1·26	51	3·83	4·45	Roma	1·53	48	0·72	6·88
<i>South Coast.</i>									
Biggenden	1·31	23	2·58	2·62	<i>State Farms, &c.</i>				
Bundaberg	1·92	39	3·33	2·88	Bungeworgorai ...	1·88	8	0·54	7·05
Brisbane	2·31	71	4·68	6·14	Gatton College ...	1·44	23	2·12	4·12
Childers	1·67	27	2·59	3·93	Gindie	1·14	23	0·73	2·85
Crohamhurst	2·94	30	3·26	7·85	Hermitage	1·80	16	2·96	6·37
Esk	2·00	35	2·89	4·24	Kairi	1·19	8	2·73	1·73
Gayndah	1·49	51	3·16	2·78	Sugar Experiment				
Gympie	2·17	52	2·64	5·40	Station, Mackay	1·51	25	4·37	6·97
Glasshouse M'tains	2·41	14	...	6·62	Warren	1·27	8	2·50	5·42
Kilkivan	1·70	43	2·21	2·22					
Maryborough	1·95	51	2·47	3·46					

NOTE.—The averages have been compiled from official data during the periods indicated; but the totals for July this year, and for the same period of 1921, having been compiled from telegraphic reports, are subject to revision.

GEORGE E. BOND,
State Meteorologist.

THE HUMAN MACHINE ON THE LAND.

Following are extracts, continued from the August Journal, from an interesting contribution to "The Journal of the Ministry of Agriculture" (U.K.), by W. J. Malden. Presenting a new view of "farm labour as farm athletics" they will be appreciated.

TRAINING IN FARM LABOUR IS EASY.

However, training in farm labour is a very simple thing, and is capable of being taught easily and systematically. That amongst older men, there would be opposition to this there is no doubt, and many who have tried to inculcate fresh methods have met a resistance which has caused them to discontinue their efforts, as they have found that sometimes it is better to carry out a bad method well than a good method badly.

In systematising work I have followed closely the practices in the more strenuous sports. No matter what the physical work or sport, no one commences to do it in the right way, whether it is handling a golf club or a scythe, and unless the proper way is shown little skill is obtained. It has to be remembered that a man is a machine—the most wonderful machine in the world—capable of doing any work performed by the most intricate machinery. He is superior to farm animals because they are horizontal machines capable of doing work only in a straight line forward or backward. Man is a hinged vertical machine not only doing this, but able to stoop and lift heavy weights vertically, which a horse cannot do. Also he has lateral action; by a heave from his hips and a shoulder jerk, he can pitch a sack of wheat sideways some feet clear of himself. He also has linked action through the arms by which he gets arm swing in association with body swing, and so can use a scythe or an axe, and throw heavy bodies from side to side by hand grip. Again, when using a tool he can get an up and down action from arms and body, as in pumping or threshing with a flail. He can also pull with the arms, using body weight. He can utilise the back swing over the hips, together with the leg drive, as in rowing, hoeing, or tug-of-war. He can lift upwards as in digging, or pitch sheaves, or swing a long hedging bill. In fact there is practically no action or combined action he cannot perform. His hinges at the ankle, knee, hips, shoulders, wrists, and fingers are under the influence of muscles and tendons, which flex and give rise to powerful actions, which are often assisted by dead weight, and their proper use takes advantage of leverages; moreover, with tools in hand a man finds leverage from these as well as from outside conditions. We do not think of ourselves as machines until we go in for sports; yet a skilled athlete is, but an expert artisan in an unproductive calling. A man with skilled training takes little out of himself as compared with one untrained. It is the same in all farm work; brute strength is helpful, but a weaker man who has got the knack can beat the unskilled any and every time, just as an old man who is skilled is worth more on a farm than a young one unskilled.

"Putting one's back into work" means much more than mere exertion: it means using one's force and dead weight to the best advantage. The greater part of all heavy work should be done by the back and legs through leverage and momentum obtained through the joints or hinges, and to a large extent these are obtained merely by skill in actuating them, viz., learning how to apply them to the best advantage. The arms and hands are convenient means through which the power is transmitted to tools, they give 'finish' of work, and add to celerity. Knack is merely a proper co-ordination of mind and muscle brought to the position where effort is not needed to work them together; but one may have a bad knack so it is necessary to learn the correct method of working.

When the best method of working is decided upon, it will be found that it comprises a certain number of actions to complete an operation; and these actions will be repeated in the same sequence in each operation. I have analysed the various operations into individual actions, eliminated the wasteful ones, and taught the others separately. Next they are run together and operation is linked to operation. As these are repeated there must be an easy connection between them making a series of smooth movements each similar, but necessary for continuous work. We see it in mowing, hoeing (when done in the proper manner), digging, axe work, planting cabbages, &c. Finally, the human machine tunes itself up to a speed compatible with endurance through an average working day.

NEED FOR INTELLIGENT OBSERVATION.

However, the human machine should be made to bring its intelligence to bear, to realise its powers, and the mechanical forces within it. The simplest laws of mechanics must be followed. These can be taught very simply and quickly by simple illustration. It may be mentioned that little effective work can be done with the legs straight and rigid. The body and legs must relax, otherwise the rocking and rolling actions obtainable about the hinges or joints at the hips, knee and ankle, so necessary to give effect to body swing, either fore and aft or laterally, cannot be obtained. They give an opportunity to take advantage of good footwork and stance

—two of the first essentials, as they afford the opportunity to make use of momentum, and to regain equilibrium, without which rythmical actions will not be maintained.

Then, again, relaxation is needed to allow the body to go down to the squat or crouch to do any work where stooping is required, and to do it without a backache—as in cabbage planting. The body must always have an easy balance or poise, or it will be overbalanced, so that power is lost and a proper sequence of actions cannot be taken. It is not necessary to go near to a man to see if he is working properly; it is shown as soon as he can be clearly seen. Sufficient proof is afforded by the fact that a man keeps time with himself throughout his work. It may be clearly seen whether a man works inside his work, or uses a tight grip where he should use the running hand, or uses the ham knuckle jerk in lifting a sheaf on to a wagon or rick, or is using his body leverage and not merely an arm lift or swing. Whether he understands the simple laws of levers as applied to the mechanism of his own body, has some knowledge of a suitable line of draught, realises the advantage of using his reach, has a notion of timing an action or values the effect of wrist work and other points, is discernible to anyone who has a proper knowledge of skilled workmanship.

SIMPLE INSTRUCTION.

By simple demonstration all these are easy to teach to the old or young. It is so simple that it can be taught to children of almost any age, and could be taught in any village school playground; moreover, a boy leaving school at fourteen could be trained thus in many necessary forms of work, and be skilled in work, whereas otherwise he would go on to a farm without skill, and often by working where poor skill prevails, even after a lifetime on it would remain inefficient.

That strength is not the ruling influence in effective working I recently demonstrated through a cinematograph film showing girls after three months' training doing very varied work, including most of the heaviest done on the farm. By the proper application of their powers they were able to work without undue fatigue, they got the knack of doing the work in the most effective manner, and they worked with perfect rhythm.

It may be taken as a pretty safe axiom that if dung is loaded and spread by long handled forks, if hoeing is done by dub-headed hoes instead of swan necks, and if hedges are trimmed back with short (one handed) swaps or fagging hooks, then the standard of work generally is a low one, whilst the absence of cabbages in a stock-raising district is pretty good evidence that the men have not learned to stoop without making their backs ache. Yet nothing is easier than transplanting done skilfully. With a proper stoop there is no need for backache. In many districts there is not a man who can plant 2,000 cabbages a day, yet after short training they are able to do it, and find it easy to plant 5,000. Where this is done the crop is cheaper and more reliable than any other form of root-growing.

In view of the large number of persons who have come on to the land wholly unskilled, with little likelihood of training whereby they will become skilled, whether they come as workmen, small holders, men from the services, allotment holders, who are spending energy with small results, one cannot fail to see the low efficiency on the land. Boys come to the land as stop gaps with no knowledge, skill, or incentive to work. They think that a fixed wage now will see them through life, but without skill it will not. Any training or incentive to skill is sorely needed to restore and maintain craftsmanship in agricultural labour. It is necessary if the land is to be kept under cultivation. The significance of this is obvious.

QUEENSLAND TREES.

By C. T. WHITE, F.L.S., Government Botanist, and W. D. FRANCIS,
Assistant Botanist.

No. 14.

PENNANTIA CUNNINGHAMII.

This species, which abounds in the scrubs of Eastern Australia from Illawarra, New South Wales, to D'Aguilar Range (Mount Glorious), Queensland, attains a height of about 80 feet and a barrel diameter of 3 feet. The barrel is often irregular or angular in cross-section, crooked, and leaning to one side; so-called sucker (coppice) shoots are often frequent on the barrels. The bark is grey or brown in colour, and often somewhat scaly. When cut it is seen to be reddish-brown in colour and measures $\frac{1}{4}$ inch thick on a tree with a barrel diameter of 3 feet. Mr. Kruger, Wood Technologist of the Forestry Department, informs us that the wood is likely to become valuable, as it promises to be an excellent substitute for English beech; he recommends its use for planes, brush-backs, &c. Hitherto the timber has been regarded as almost useless. We have noticed that the trees are very abundant in certain parts of the scrubs in the ranges eastward of Emu Vale, in the Killarney District.



Photo by the Authors.]

PLATE 17.—*PENNANTIA CUNNINGHAMII*.
A specimen in the Ranges eastward of Emu Vale.



Photo : Dept. Agriculture and Stock.]

PLATE 18.—PENNANTIA CUNNINGHAMII. FLOWERING TWIG.

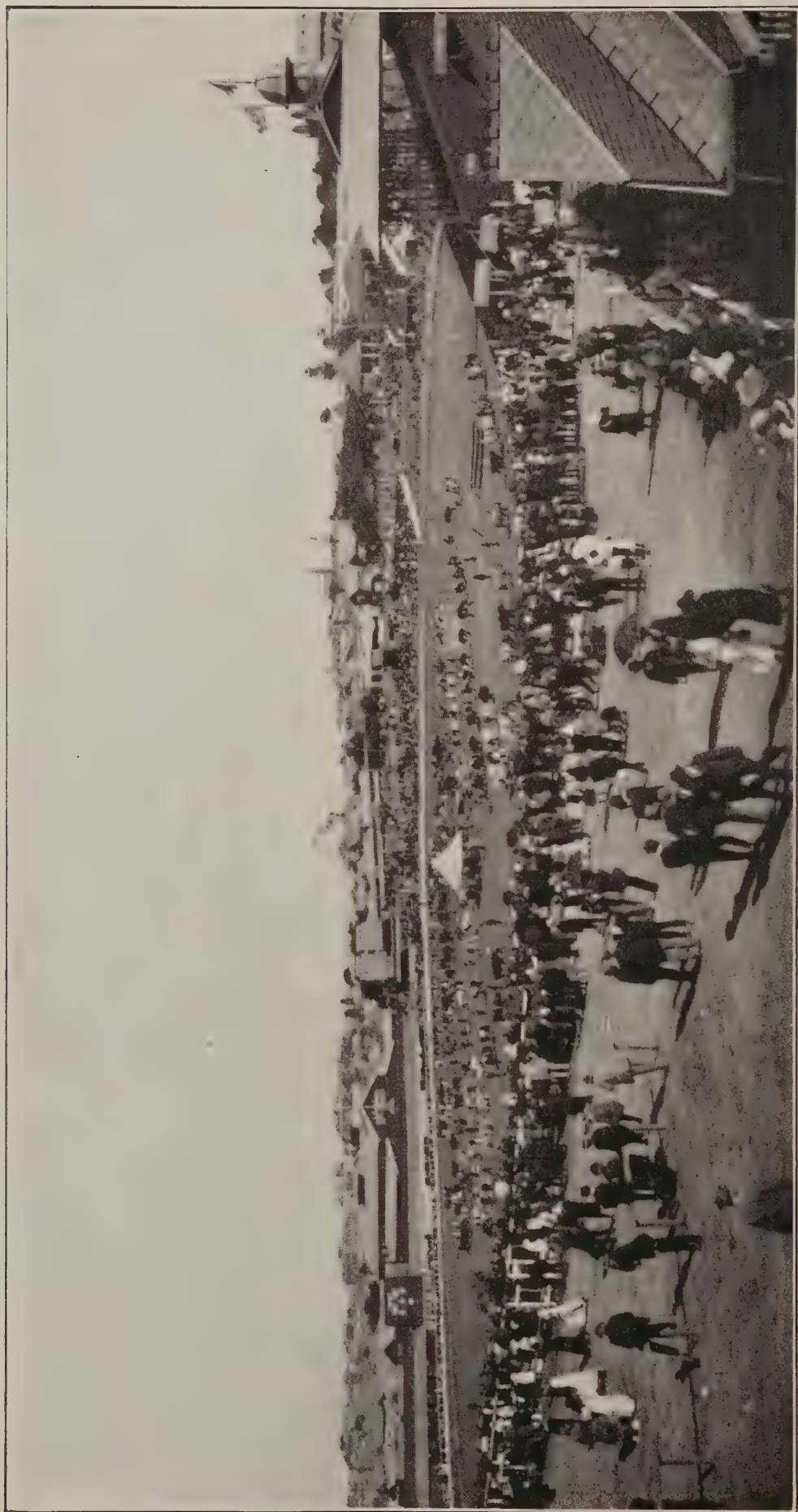


Photo : Dept. Agriculture and Stock.]

PLATE 19.—THE GRAND PARADE, ROYAL NATIONAL EXHIBITION, BRISBANE, 1922.

ROYAL NATIONAL EXHIBITION.

Perfect weather, typical Queensland days, favoured the 1922 Exhibition of the Royal National Association. The Show was a pageant of prosperity, a small-scale representation of the rural richness of a great State, and a triumph of organisation and achievement.

This year the Court of the Department of Agriculture and Stock, attractively and artistically set out, presented many new features. The quadrangular court, with its various exhibits and trophies, showed a striking uniformity of arrangement; and the harmony of the colour scheme, between the soft rendering in shades of grey and ivory white, relieved with maroon, and the blending of the natural shades of green of the palms, staghorns, ferns, and festoons, appealed irresistibly to æsthetic taste.

A presentation of exhibits in a right atmosphere was in itself a fitting prelude to what really was a most practical exposition of the work coming within the scope of the Department. Through their activities and applied interests—so fitly illustrated—its officers render signal service to that large body of producers who are the mainstay of the complex social and industrial life of this great State.

In the Court the observer, the inquirer, and the student were brought into immediate touch with several of Queensland's chief industries—sugar, wool, maize, wheat, cotton, and general agriculture. To them was presented an opportunity for gaining a clear and close insight into certain branches of work, both practical and scientific, engaging the attention of the members of the staff of the Department. As the Brisbane Show is a microcosm of the State, so the Departmental Court is a microcosm of a most important section of the Public Service.

The work of the Bureau of Sugar Experiment Stations found representation in a display of a number of new canes which are under test for the purpose of determining the best commercial varieties for different districts. Some excellent samples of sugar-cane from Banana Pocket, Proserpine district, were also exhibited to illustrate what this rich and fertile locality is capable of producing.

The wool display, with its attractive samples drawn principally from clips sent in to the Wool Branch for classification and sale, was made primarily for the purpose of bringing the work of this section of the Department before small flockmasters, and was indicative also of what is being done by the Sheep and Wool instructional staff.

The part taken by the Stock Experiment Station at Yeerongpilly in the general scheme for the enlightenment of the stock owner was clearly demonstrated by specimens, cultures, diagrams, and printed educational matter connected with the work of a vigorous institution which plays no mean part in the investigation and combating of the tick fever and other problems which harass and at times menace the live-stock industry.

A completeness was given to these two lastmentioned sections by the display of a striking collection of grasses by the Government Botanist, which, on account of their great variety, natural richness, and abundance in good seasons, afford unmistakable proof of the fact that the State possesses an inheritance worth millions of pounds sterling per annum to the stock owners—a heritage which obviously deserves more consideration than it has yet received.

In the comprehensive trophy devoted to General Agriculture prominence was given to maize, and to the methods adopted by the Department in the highly technical and effective work of seed improvement.

What seed selection will do in the matter of increased production and in the standardisation of types of grain, was exemplified in the wide range of exhibits staged. The application of these principles of selection have found practical expression in Departmental crop demonstration areas, and it was shown on the one hand that in a season when the average yield of maize for the State did not exceed 20 bushels per acre, 117 bushels per acre were harvested from prolific strains of selected seed grown under field conditions.

Work of this character, carried as it is into the realms of sound agricultural practice, cannot be otherwise than most helpful to the maizegrower and to the industry generally. The fact that high-yielding strains of seed are available, and are being added to and improved, should engender a feeling of optimism for a future which holds out the promise of increased returns for time and labour spent in production.

A special section was devoted to wheat. It is only within the last few seasons that this most important cereal has attained such distinction as a crop for Queensland, and in many localities it is used for the dual purpose of fodder and grain—fodder, primarily, for the production of milk and for sheep-raising, and grain as the chief support for the industrial life of the community.

It is generally conceded that the existing scheme for the co-operative marketing of wheat under the pool system has done much to place the industry on its present firm footing.



Photo : Dept. Agriculture and Stock.]

PLATE 20.—THE OPENING CEREMONY, ROYAL NATIONAL EXHIBITION, BRISBANE, 1922.
HIS EXCELLENCY LORD FORSTER, GOVERNOR-GENERAL, ADDRESSING THE ASSEMBLAGE.

Another and most important reason for this improved position is that better and more reliable varieties of wheat are now in cultivation. There is less danger from rust than formerly, and the milling qualities of the grain have also been much improved.

For many years—practically a quarter of a century—the Agricultural Department has directed effort to the improvement of existing varieties. As a result, many excellent wheats were produced and brought into cultivation. Crossbreeding and selection, and the highly technical work in the evolution of new varieties, has been carried out for a number of years at the Roma State Farm. This is correlated with the work of the field staff. An interesting illustration of what has been accomplished was on exhibition, and a fine collection of new crossbred wheats from the Wheat Breeding Farm and demonstration plot areas were also staged.

Details of the scheme for the "Improvement and Classification of Existing Varieties of Wheat," which was recently brought forward by the Department and approved of by the Advisory Committee of Agricultural Council and the Wheat Board, were set out in detail on the wheat trophy, for the express purpose of disseminating information to growers interested in the subject. Effect has already been given to the scheme, which has been put on a practical working basis.

The display by the Pure Seeds Branch of the Department was of a most instructive character, and covered concisely the purity and germination of seeds, commercial seeds and seeds of poisonous plants, and demonstrated clearly the part played by the Department of Agriculture in protecting the interests of farmers.

Another informative feature was an exhibit prepared by the Government Botanist, which proved to be of absorbing interest and concern to stockowners and primary producers generally. This exhibit was made up of mounted specimens of well-known edible shrubs with which Queensland is particularly well endowed, also a number of specimens of plants reputed to be poisonous to stock.

The branch of the Department controlled by the Entomologist and Vegetable Pathologist illustrated graphically the life histories of various insects. Another section dealt exhaustively with the Banana Beetle Borer and its depredations.

The *Queensland Agricultural Journal* was represented in the departmental display, and a branch office was located in the Court for the enrolment of new subscribers, and for the convenience of inquirers on agricultural subjects, and matters relating generally to departmental activities.

A new feature introduced into the Departmental Court this year was an extensive and finely grouped display of secondary products from the State Cannery, in which prominence was given to a comprehensive assortment of fruits, jams, preserves, and sauces. The "get up" of this display provided convincing evidence of the expertness of the State Cannery staff in the preparation of products for market, and was worthy of commendation by the most exacting commercial critic.

DEPARTMENTAL COURT EXHIBITS.

SUGAR EXPERIMENT STATIONS.

The Bundaberg Sugar Experiment Station exhibited a number of new varieties, many of them being seedling canes raised in Queensland, Hawaii, Mauritius, India, and Java. Full descriptions of these appeared upon the cards attached to the canes, which also gave their commercial cane sugar content. Many of these canes are at present undergoing chemical and field tests, while others have passed the probationary period, and are being distributed to canegrowers. Of these the most successful so far have been Queensland 813, 970, 1098, Java E.K. 1, E.K. 28, India Shahjahanpur No. 1, Hawaii 146 and 227. These, however, only comprise a small portion of the canes which have been distributed from the Sugar Experiment Stations in the course of the past twenty years. Prior distributions include such well-known canes as Badila and the Corus, which are very largely grown in North Queensland. One of the principal objects of the Experiment Station is the constant introduction of new varieties and their commercial testing. Before any variety is allowed to leave the Experiment Station it is subjected to chemical and commercial trials through plant, first ratoon, and second ratoon crops. Each variety is tested not fewer than four times during the sugar season, so that records are obtained which afford farmers and millowners information as to whether canes are early or late, and as to whether their sugar contents are sufficiently high to warrant their adoption. This is combined with agricultural trials on the field, so that it may be determined whether such variety is a good cropper. It is further rigorously watched for evidence of disease, and no affected cane is allowed to go into distribution. When a variety has passed this trial it is carefully examined and packed before being sent to growers living at a distance from the Station. Farmers close at hand are permitted to visit the local

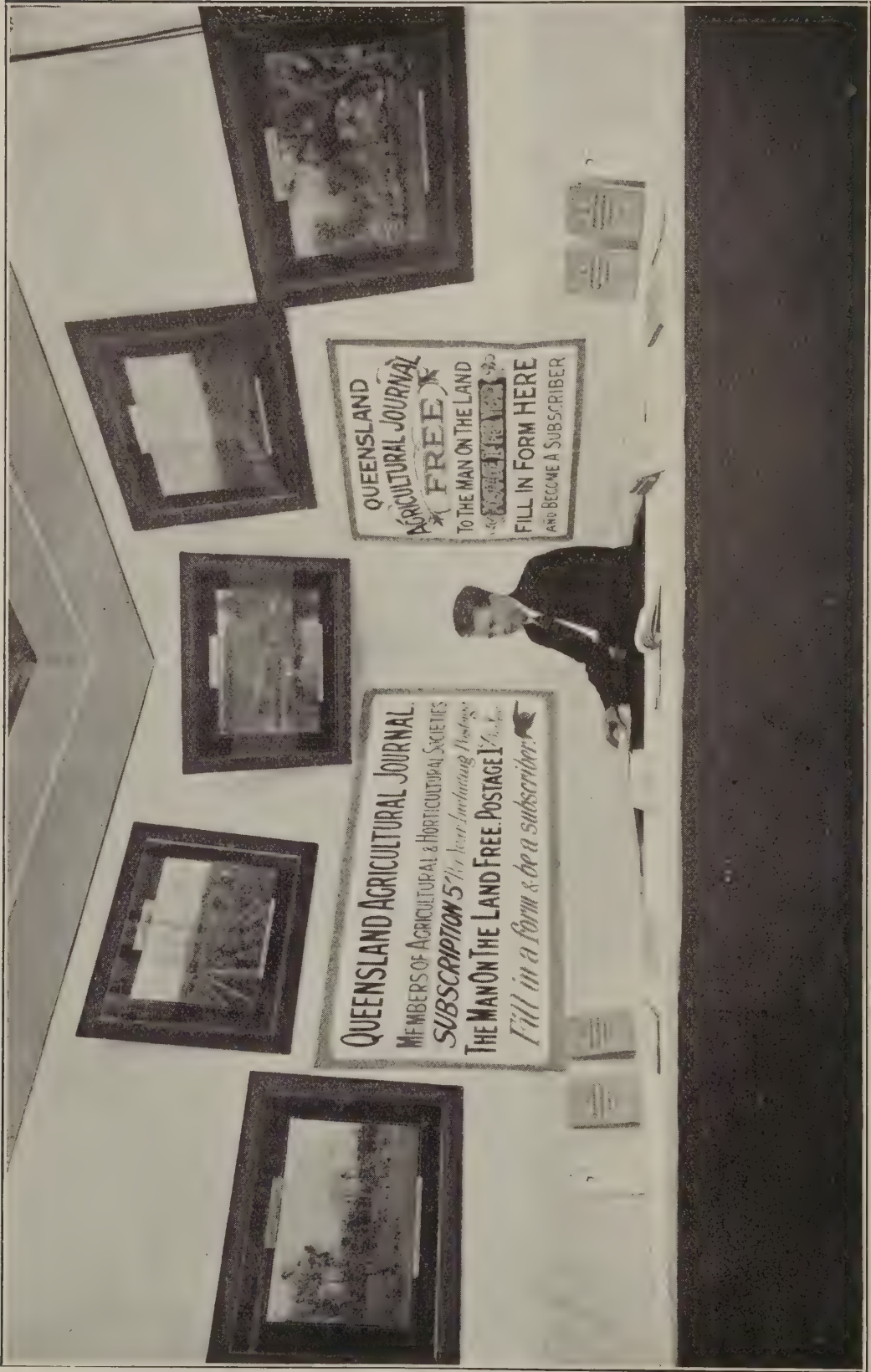


Photo : Dept. Agriculture and Stock.]
PLATE 21.—THE JOURNAL CORNER, COURT OF THE DEPARTMENT OF AGRICULTURE AND STOCK.

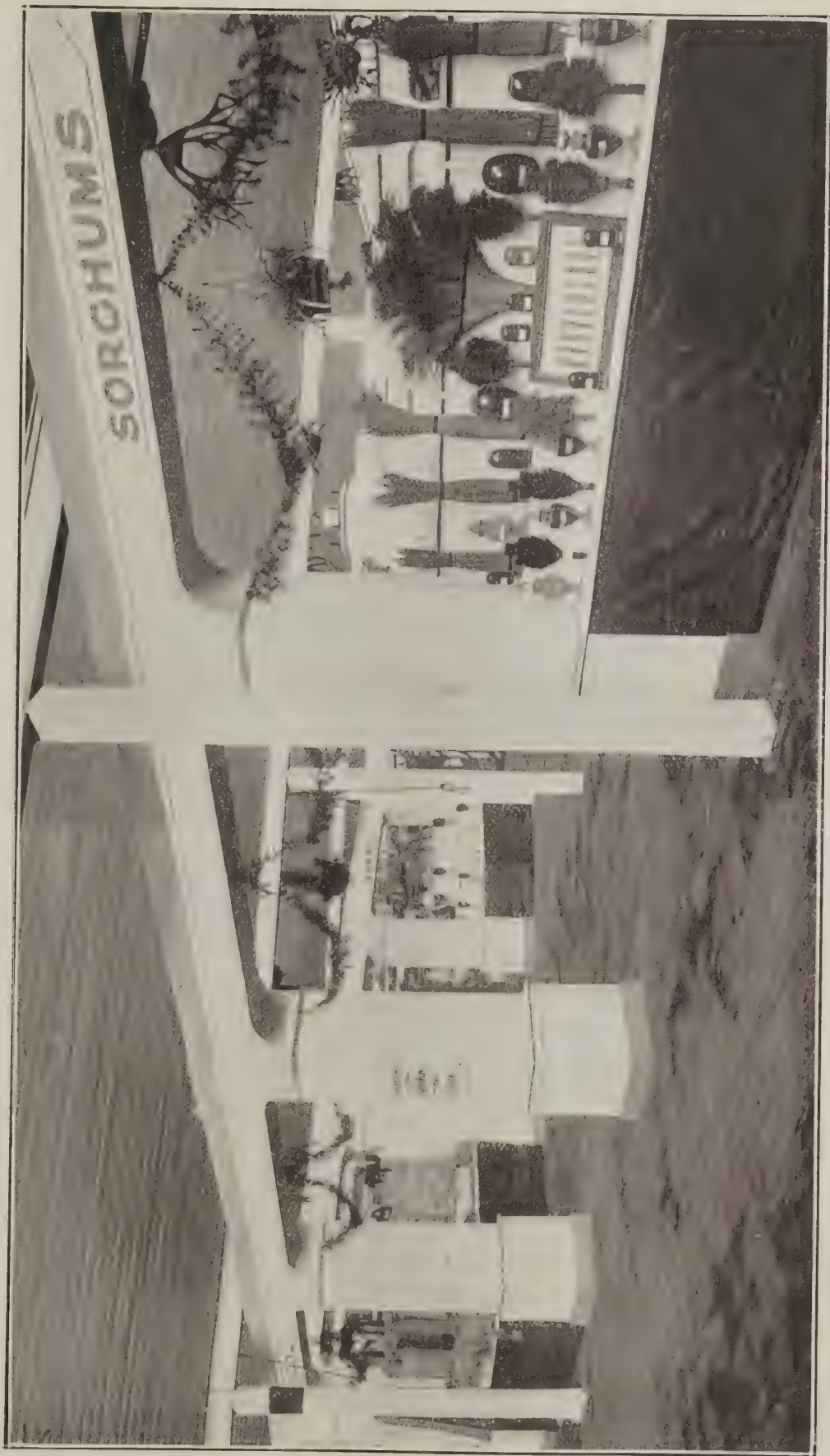


Photo: Dept. Agriculture and Stock.]

PLATE 22.—A VIEW OF THE COURT OF THE DEPARTMENT OF AGRICULTURE AND STOCK



Photo : Dept. Agriculture and Stock.]



Photo : Dept. Agriculture and Stock.]

PLATE 24.—CENTRAL COTTON TROPHY, COURT OF THE DEPARTMENT OF AGRICULTURE AND STOCK.

Station and remove any variety selected for distribution. All canes are distributed free to canegrowers. Worthless varieties are discarded.

Information of this kind could only be secured by growers and millers at the cost of much time and money, and the rejection of many useless canes by the mills would obviously be accompanied by severe loss to the growers.

As an adjunct to the work described the Experiment Station at Innisfail is now raising cane from seed.

Work at the Experiment Stations also comprise the study of soils, cultivation, and fertilising. It is sought to introduce improved methods of cultivation, liming, fertilising, rotation of crops, and conservation of moisture; and growers are taught the principles of cultivation and business methods by visits to the Experiment Stations, and by lectures and addresses delivered in the several sugar districts, and by bulletins. It may be claimed that this work has been highly successful as the following figures will show:—

INCREASE IN CANE AND SUGAR PRODUCED PER ACRE AND DECREASE IN TONS OF CANE REQUIRED TO MAKE ONE TON OF SUGAR.

Period.					Average tons of Cane per Acre.	Average tons Sugar per Acre.	Average tons of Cane to one ton of Sugar.
1899-1908	..	..	..	..	14.76	1.60	9.20
1909-1918	..	..	..	..	17.37	1.99	8.68

The Sugar Experiment Stations analyse soils free for canegrowers, and advise, by personal interview or by letter, on the requirements of the soil in the way of application of lime where necessary, green manuring, and fertilisers, and the treatment of the land by proper cultivation. Cane samples are also tested free of charge, so that growers may know the best time at which to cut their cane. Field officers also move around among farmers giving advice on cultural operations.

Investigation and research work in connection with the sugar-cane's most serious pest—the grub—is now being carried out by the Bureau of Sugar Experiment Stations in a systematic manner, and numerous bulletins have been issued upon the subject. The Entomological Laboratories are situated at Meringa, near Cairns, which is the centre of the worst grub-infested region in North Queensland. The work now undertaken includes:—

Morphological study of reproductive organs of beetles, with relation to the period of ovipositing and the number of eggs produced.

Morphological study of the fungus parasites.

Breeding of the various local parasitic and predaceous insects in cages.

Introduction and breeding of beetle parasites from other countries.

Experimental methods for the rapid multiplication and wide distribution of our fungus parasites.

Introduction of bacterial and fungus enemies of the beetles from other countries.

A further study of various light-traps for the beetles.

A further study of repellents.

Field and Laboratory experiments in the use of poisons for grubs.

Field experiments to determine the relation of fertilisers to resistance; using green manure, stable manure, meatworks' refuse, nitrate of soda, and other substances.

The work of the Sugar Experiment Stations, therefore, in relation to its promotion of the agricultural welfare of Queensland in connection with the sugar industry cannot be over estimated. When it is considered that this industry is the greatest agricultural one in Queensland, with an estimated yield this year of 285,000 tons of sugar, computed to be of the value of over £9,000,000, it can be seen how highly necessary it is that it should be assisted and encouraged in every possible way.

Apart from its economic value, it has a supreme national significance and has already proved a valuable factor in peopling the North. According to the last census the increase in population in the last ten years of the Herbert Electoral Division was 19.4 per cent., or 14,929 persons—a greater increase numerically than in any other part of the Commonwealth.

THE A.S.P.A. COURT.

The main portion of the task of fittingly representing Queensland's foremost agricultural industry was allotted to the Australian Sugar Producers' Association. Text and picture illustrated the importance to our economic life of this great staple, and incidentally strongly emphasised its political significance in respect to our effective peopling of the North.

A series of photographs in careful sequence enabled one to follow the story of sugar from the planting of the cane to its final emergence as a marketable commodity. The several phases of the great industry, a combination of agriculture and manufacture, were strikingly depicted, and they conveyed a lesson in economical co-operation by the evidence of the value of sugar and its by-products to other business enterprises. The educational value of the exhibits in this Court was immense. The connection, for instance, between cane and power alcohol was shown by interesting stages, and the comprehensive nature of the Court and telling texts panelled appropriately conveyed convincingly to the public the high value of an industry around which cities, towns, and thriving districts have been built. The facts and figures displayed provided much room for thought and stimulated support for an industry that has become a corner stone of the White Australia policy. As an example it was shown that 15,000 tons of raw sugar, valued at £1,365,000, will pass over the Cairns wharves this season. Then a vista opened up of extended fields of vibrant industry, the roots of which strike deeply into the soil of Queensland canefields, and the branches of which spread widely through shipping, manufacturing, and commercial spheres. Follow the raw product to the mill, thence to the refinery, on to the market, to its ultimate absorption into other industries, and one gains an idea of what the engineering and machinery trades and the manufacturing and distributing interests owe to Queensland sugar. When all this is considered, besides the canegrowers' gaining their living direct from the land, and the thousands of workers—white Australians—employed in harvesting and handling the products of the sugar and allied enterprises, the economic importance of the sugar industry is understood.

COTTON.

The revival of cotton-growing in Queensland has opened up a wide and alluring vista of prospective prosperity arising from our vast reserves of untouched fields. Already the bright promise of the present revival has stimulated a strong interest in the textile trade, and the more optimistic have already pictured Queensland not only as the cotton State of the Commonwealth, but the new home of a thriving textile industry.

At the Exhibition the Department of Agriculture and Stock and the Australian Cotton-growing Association served efficiently a wide public interest. In the departmental Court a striking central trophy, the work and design of Mr. H. W. Mobsby, F.R.S.A., typified a coming Queensland industry and symbolised the wealth that will roll in fleecy billows from the linters and looms of Queensland cotton gins and spinning mills when the forces of field and factory have been allied and applied to the establishment and advancement of a new and great Australian industry.

A small cotton gin at work attracted an interested crowd, and the operation of separating lint from seed was watched with marked attention. Probably no other crop has "caught on" so quickly with the Queensland farmer as cotton, as it represents a cash return within six months of planting the seed. Under the existing guarantee system, returns have often exceeded £35 per acre gross.

Already, with only a few thousand acres under cotton, a sum of £90,000 sterling has been paid to growers for their crop. To date, sufficient seed has been supplied to plant over 65,000 acres, representing a prospective increase in the area to be put under crop this year of approximately 60,000 acres.

The existing arrangement, entitling growers to an advance of 5½d. per lb. for seed cotton until 30th June next year, has been extended by the Government in the form of a guarantee for a further period of three years from the 1st August, 1923, to the 31st July, 1926. For the first year of the new guarantee period—that is, from 1st August, 1923, to 31st July, 1924—the advance will be arranged on a sliding scale basis in accordance with the grade of cotton, with a maximum price of 5½d. per lb. for seed cotton of good quality free from disease and of 1½-inch staple. The details of the advance during the remainder of the extended period—namely, two years—will

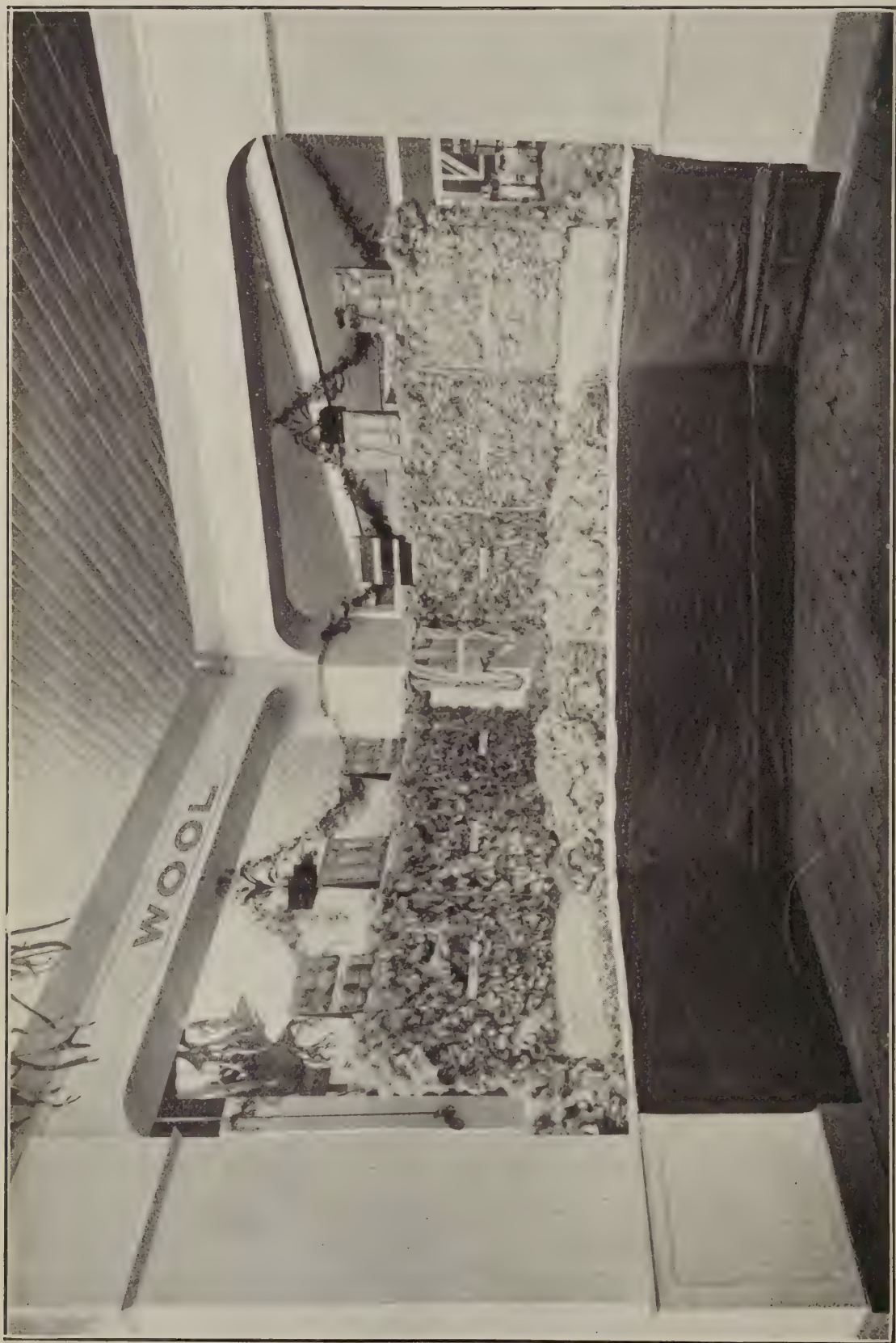


Photo : Dept. Agriculture and Stock.]

PLATE 25.—WOOL EXHIBIT, COURT OF THE DEPARTMENT OF AGRICULTURE AND STOCK.



Photo : Dept. Agriculture and Stock.

PLATE 26.—THE STATE CANNERY DISPLAY, COURT OF THE DEPARTMENT OF AGRICULTURE AND STOCK.



Photo : Dept. Agriculture and Stock.]

PLATE 27.—PANELS OF WHEAT, SUGAR CANE, AND GRASSES, COURT OF THE DEPARTMENT OF AGRICULTURE AND STOCK.



Photo : Dept. Agriculture and Stock.]

PLATE 28.—GRAIN EXHIBIT, COURT OF THE DEPARTMENT OF AGRICULTURE AND STOCK.

be determined later. A condition is made that the seed must be procured from the Department of Agriculture.

The activities of the Australian Cotton-Growing Association, and the establishment of up-to-date ginning plants to deal with the crop, have had an excellent effect also in placing this industry on a solid foundation.

THE FRUIT DISPLAY.

Dominating the fruit display was the fine central trophy and its supporting array of orchard products, which formed the non-competitive collection shown by the Southern Queensland Fruit Growers' Society. The society provides a striking example of the benefits of organisation as applied to fruit production and distribution, and the wonderful display of fruit from sub-tropical gardens and the temperate Granite Belt was attractive evidence of its well-directed activities. Represented in the collection were Montville, Mapleton, Perwillowen, Nambour, Bli Bli, Yandina, Woombye, Palmwoods, Elimbah, Ormiston, Cleveland, Manly, and Welling-ton Point. The Blackall Range generally sent some of its choicest citrus products from its peaceful, picturesque, and profitable groves; the North Coast contribution was made up largely of pineapples and bananas; and the South Coast was creditably represented by strawberries and custard apples. The pineapples and papaws were large, the largest of the latter weighing 12 lb., while many of the former were as big as melons. In conjunction with the meritorious exhibit of the S.Q.F.S. was a demonstration of a patent fruit-grader. The Summit (Stanthorpe District) Fruit-Growers' Association sent an excellent collection of apples, which headed the honour list in their classes.

THE BOONAH RURAL SCHOOL.

Established only two and a-half years ago, the Boonah Rural School by its remarkably fine display showed evidence of wonderful progress, controlled enthusiasm, latent and developed skill, and the team-work spirit. The versatility of the pupils in design and craftsmanship was a revelation of the adaptability of the young Australian. The aim of the school is to turn out boys and girls well equipped with



Photo : Dept. Agriculture and Stock.]

PLATE 29.—BOONAH RURAL SCHOOL DISPLAY.

knowledge and skill that can be applied to the daily duties of a rural vocation. Maize-growing, milk and cream-testing, photography, poultry-raising, forestry exhibits, artificial grasses, pot plants, electrification of seeds, kindergarten work, woodwork, tinwork, leatherwork, dressmaking, millinery, cookery, laundry work, knitting, soap-making, silkmaking, confectionery, jams and preserves, cordials, preserved vegetables, flowers—these are some of the things that occupy the attention of the pupils of the Boonah Rural School, and assisted to make up an exceedingly creditable and interesting display.

WOOL SECTION.

In this section some very high class wools were shown. With a few exceptions all the fleeces staged were selected from wools handled under the "Farmers' Wool Scheme."

The fleeces were ticketed with the qualities and price per pound realised on sale, and the very best wools in Queensland were represented in the exhibit.

The "Farmers' Wool Scheme" has now been in operation for five and a-half years. Over 200 farmers have taken advantage of the scheme with satisfactory results to them. In the course of that period over 1,000 bales have gone through the departmental wool room, and considering that the limit of numbers in a flock has been placed at 1,500, this record is commendable. Included in consignments from almost every district in Queensland were clips ranging in quantity from one fleece up to twenty-seven bales. The North, as far as Burketown, most of the islands off the coast, the Far West, the coastal areas from the Tweed to Cairns, the Darling Downs, Peak Downs, and other Central district areas all sent a quota. The top price, 22½d., was received for coastal wools. The general average price right through the total works out at about 15d. per pound for all qualities. When it is remembered that the great bulk of farmers' wools is crossbred these results are very good. Latterly, however, coarse, burry and seedy crossbreds have been almost unsaleable, and in consequence the average price was reduced considerably.

Under this scheme the advantages to the small sheep farmer are many.

First.—In small quantities, his wool goes into the dags and butt sales, quite untreated. Some of the sorts may be worth, say, 18d. per pound and others as low as 3d. per pound. The buyer does not know the amount of good, bad, or indifferent wools in his consignment, and to protect himself he buys at the lowest quality price he sees.

Second.—No commission is charged, and, if required, an advance of 60 per cent. is given on receipt of wool in the departmental store.

Third.—As all the wools are pooled, the wool goes into the store as a big clip and so the charges are lighter by nearly one half.

Fourth.—If in good condition the farmers' own bales are used to repack, and a considerable saving is thus effected.

Fifth.—Skilled wool classers deal with the wools, thus ensuring evenness of "get up." There has been nothing but praise for the "get up" of the wools offered in the sales since the inception of the scheme.

The wools shown in the Wool Section at the National Association Grounds represent samples of the best received by the Department, but these illustrate the fact that any man with care and knowledge can grow wool quite equal in quality to the larger sheep farmers. No man need grow bad sheep and indifferent wool, and it is well known that ten ill-bred neglected sheep are not as good as five good animals.

In a sort of process of evolution all countries tend to subdivide and resubdivide, until the greater flocks of hundreds of thousand and tens of thousands come down in size approximating to those of the older lands, where 1,000 sheep is a large flock; the aggregate numbers on the land being very much greater than where great flocks range over extensive areas.

In Great Britain, for instance, they run on an area one-tenth of the size of Queensland sheep districts, 7,000,000 or more sheep, as many cattle as Queensland, besides horses and swine in great numbers. Queensland will some day run treble the numbers of stock she runs to-day when there are sufficient people to actually occupy and make full use of the land.

Sheep are as much a tool of a farm as ploughs or harrows. This is the teaching of history. Sheep were well named "Golden Toe" in ancient writing. Actually they were the first animals to be domesticated, and in this connection the Biblical quotation may be cited, "Abel was a keeper of sheep, but Cain was a tiller of the ground."

An officer was on duty at the Court during Show Week, to explain or instruct sheep farmers or would-be sheep farmers in all matters pertaining to the business, and free pamphlets were available to all who were interested in one of Queensland's great staple industries.

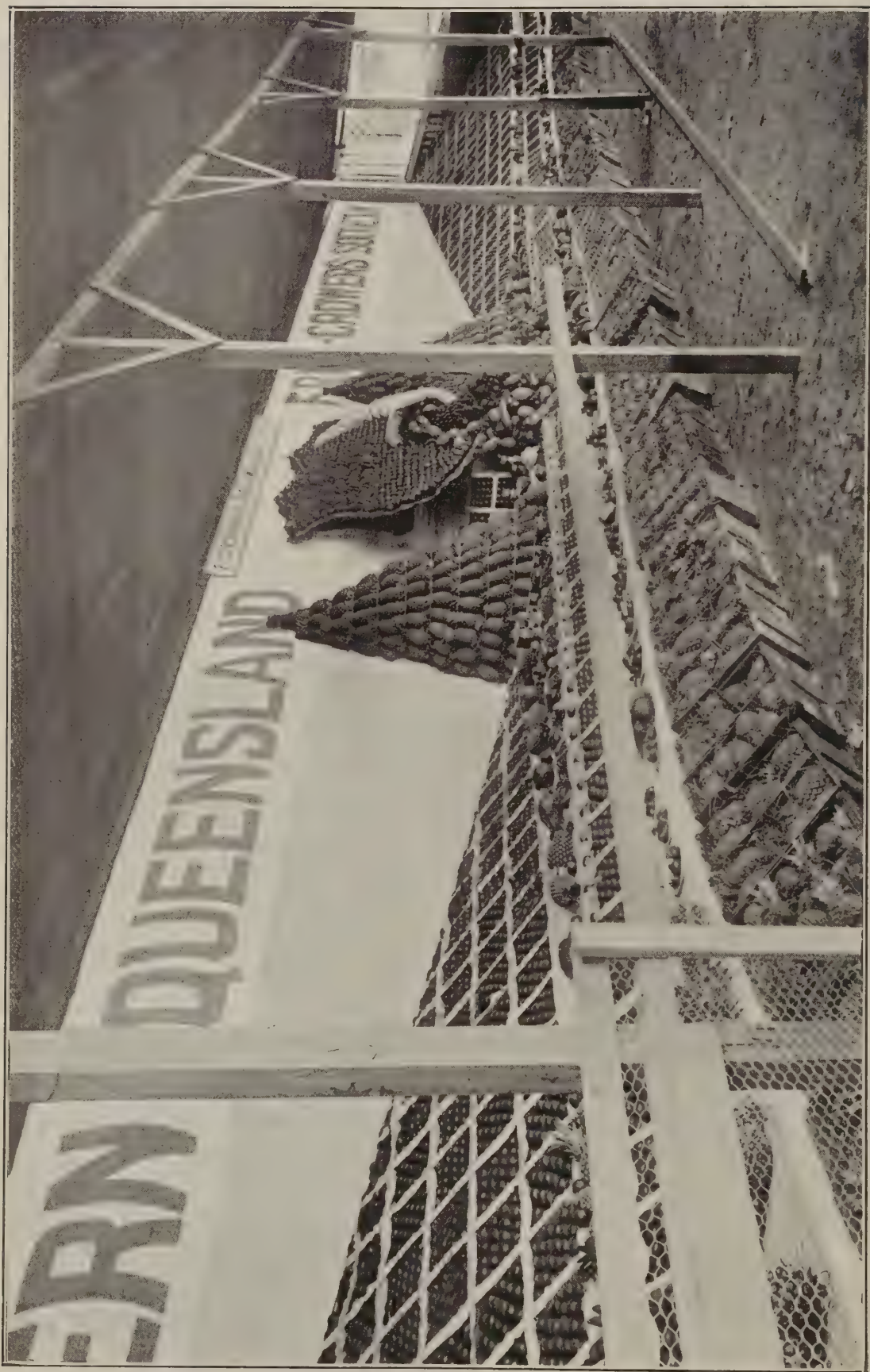


PLATE 30.—THE FINE DISPLAY OF THE SOUTHERN QUEENSLAND FRUITGROWERS' SOCIETY



Photo : Dept. Agriculture and Stock.]

PLATE 31.- SUGAR COURT—THE AUSTRALIAN SUGAR PRODUCERS' ASSOCIATION DISPLAY.

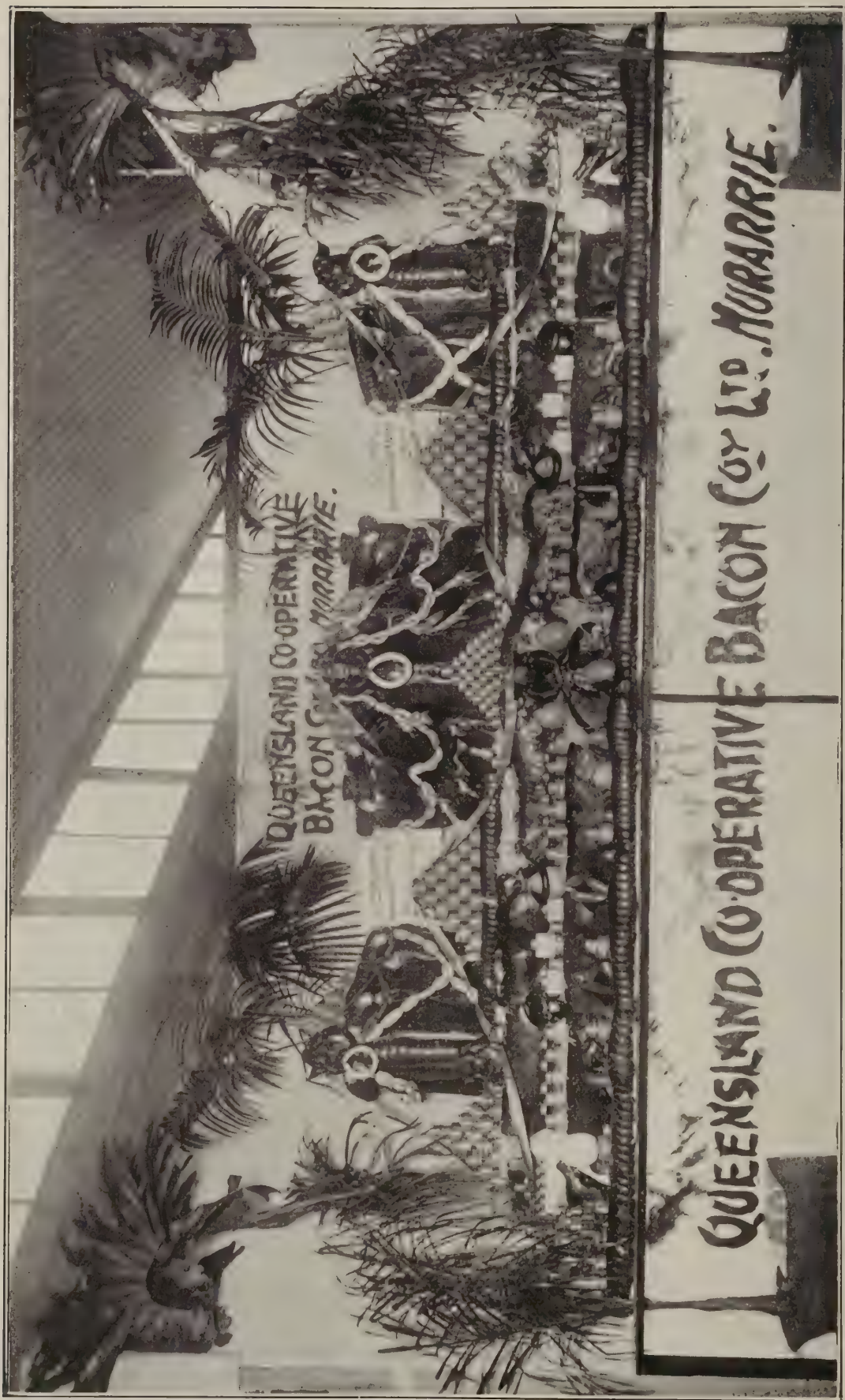


PLATE 32.—DISPLAY OF PRODUCTS FROM THE CO-OPERATIVE BACON FACTORY, MURARREE.



PLATE 33.—THE GOVERNOR-GENERAL (LORD FORSTER), AND PRESIDENT C. E. McDOUGALL INTERESTED IN THE JUMPING.



PLATE 34.—THE STATE GOVERNOR (SIR MATTHEW NATHAN), CONGRATULATING THE DRIVER OF EDNA WILKES ON HIS WIN.

STOCK DISEASES EXPERIMENT STATION, YEERONGPILLY.

Tick Eradication.

That the cattle tick continues to be a serious menace to our live stock industry was well illustrated by the numerous specimens exhibited showing its life history and development. Apart from heavy mortality from tick fever, the tick is the direct cause of injury to the hide and consequent depreciation in value.

Tick-infested cattle, apart from constant irritation, require more feed, while ticky cows give less milk.

The work of tick eradication was illustrated by numerous maps and diagrams.



Photo : Dept. Agriculture and Stock.]

PLATE 35.—STOCK INSTITUTE DISPLAY, COURT OF THE DEPARTMENT OF AGRICULTURE AND STOCK.

A striking feature of this interesting exhibit was a map and diagram showing what has been accomplished in tick eradication work in the United States, America, and in South Africa. In the first-named country there were originally 741,515 square miles tick-infested and under certain quarantine restrictions. For several years propaganda work was carried out by the officers of the Federal and various State Governments, assisted by Agricultural Societies, Stock-breeders' Associations, Farmers' Institutes, County Councils, Banking Institutions, Railway Companies, Manufacturers of Agricultural Implements, and in no small measure by the general public. The tick-infested area covered the whole or part of fifteen of the Southern States, stretching from the Atlantic to the Pacific Coast. On the 1st July, 1906, systematic tick eradication commenced, and up to the present time 510,000 square miles have been cleared up and released from quarantine restrictions. This area is equal to two-thirds, or nearly 70 per cent., of the original tick-infested country.

This great achievement has been accomplished primarily as a result of active propaganda and organisation by the staff of the Federal and State Departments of Agriculture for at least twelve months, followed by united efforts on the part of stockowners and others interested in the live stock industry.

In South Africa tick eradication has proved a great success. In Swaziland, with an area of 6,500 square miles, there are over 260,000 cattle which had to be dipped at least every three to five days. In the course of the past five years the cost of control, including erection of dipping tanks, dipping material, and European and native supervision, works out at 1s. 1d. per head of cattle per annum.

It should be pointed out that the Queensland cattle tick lives on the ground apart from its host for about six months, and that by dipping cattle on a farm every fourteen days for eight months will surely free the place from ticks.

The tick which causes East Coast fever is extremely hardy and can live on the ground apart from its host for over twelve months; therefore, it is absolutely necessary for dipping operations to be continued for at least fifteen months to clean the country and before quarantine restrictions can be removed. Moreover, as this tick has a preference for attaching and sheltering itself in the matted hair of the brush of the tail and in the depth of the ears, it necessitates hand dressing of these parts.

The overcoming of all obstacles and the successful results achieved in America and South Africa completely refutes the frequent assertions that tick eradication by dipping is impracticable in Queensland.

Contagious Abortion in Cattle.

This disease causes very serious trouble among dairy cattle, and is caused by a micro-organism, the bacillus Abortus, which was discovered by Professor Bang, of Copenhagen.

The exhibit showed examples of the organism growing artificially in tubes of Agar jelly in a partial vacuum as the germ has more or less a dislike to access to free oxygen.

There were also a series of tubes showing the method of testing the blood and milk of suspected infected animals by the agglutination test.

The staff at Yeerongpilly Experiment Station undertakes to examine specimens.

Should any farmer have reason to suspect that he has this infection among his cattle he should at once write for advice to Stock Experiment Station, Yeerongpilly.

Poultry Diseases.

Bacillary White Diarrhœa of Young Chickens.—This serious trouble causes a heavy mortality, from 60 to 80 per cent., among young chickens from five to twenty days old.

It is caused by a germ which lives within the oviduct of the hen. A proportion of eggs laid by an infected hen hatch out infected chicks, and the excretions of these spread the disease to the other birds in the brood. It has been proved that chicks that recover from the disease may carry the causative micro-organism in the ovary and serve as a source of infection in the future. Outbreaks of this disease could be controlled readily by sanitary measures, but infection through the egg must be prevented by a process of weeding out the carriers among the hens used for breeding. The exhibit displayed cultures and drawings of the bacillus Pullorum, the cause of white diarrhœa in chickens, also a series of tubes illustrating the application of the agglutination test on the blood of suspected birds.

Blackleg.

A specially attenuated vaccine for the prevention of blackleg in calves was exhibited. Its efficiency is proved by the fact that it protects over 99 per cent. of over 100,000 calves treated.

Other specimens of vaccine included those of contagious mammitis, strangles, abscess, and natural lymph for protection against pleuro-pneumonia.

Another section of the exhibit demonstrated the absolute necessity for cleanliness in connection with the production and handling of milk, and illustrated by means of plates, cultures and diagrams the benefits and advantages of pasteurisation. It was pointedly indicated that if every farmer were to scald the milk before feeding it to pigs and calves, there would be a considerable reduction in the number of these animals affected with tuberculosis.

Official records show that of 131,783 pigs killed at the bacon factories under Government inspection there were found 9,362 carcasses showing lesions of tuberculosis.

A collection of preserved pathological specimens illustrating the various manifestations of tuberculosis, tick fever, blackleg, contagious mammitis, and other stock diseases was another educative feature of a distinctly valuable display.



PLATE 36.—THE COTTON PICKER.

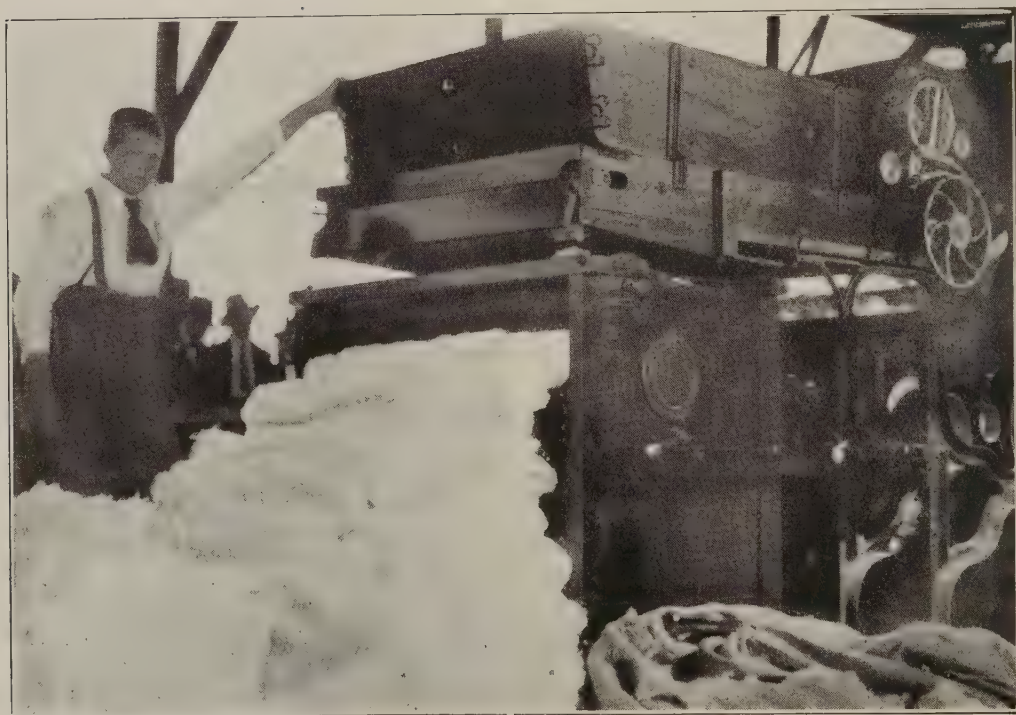
*Photo : Dept. Agriculture and Stock.]*

PLATE 37.—FLEECY BILLOWS OF LINT—COTTON-GINNING AT THE BRISBANE EXHIBITION.



Photo : Dept. Agriculture and Stock.]

PLATE 38.—WEST MORETON DISTRICT EXHIBIT, FIRST IN "A" GRADE.

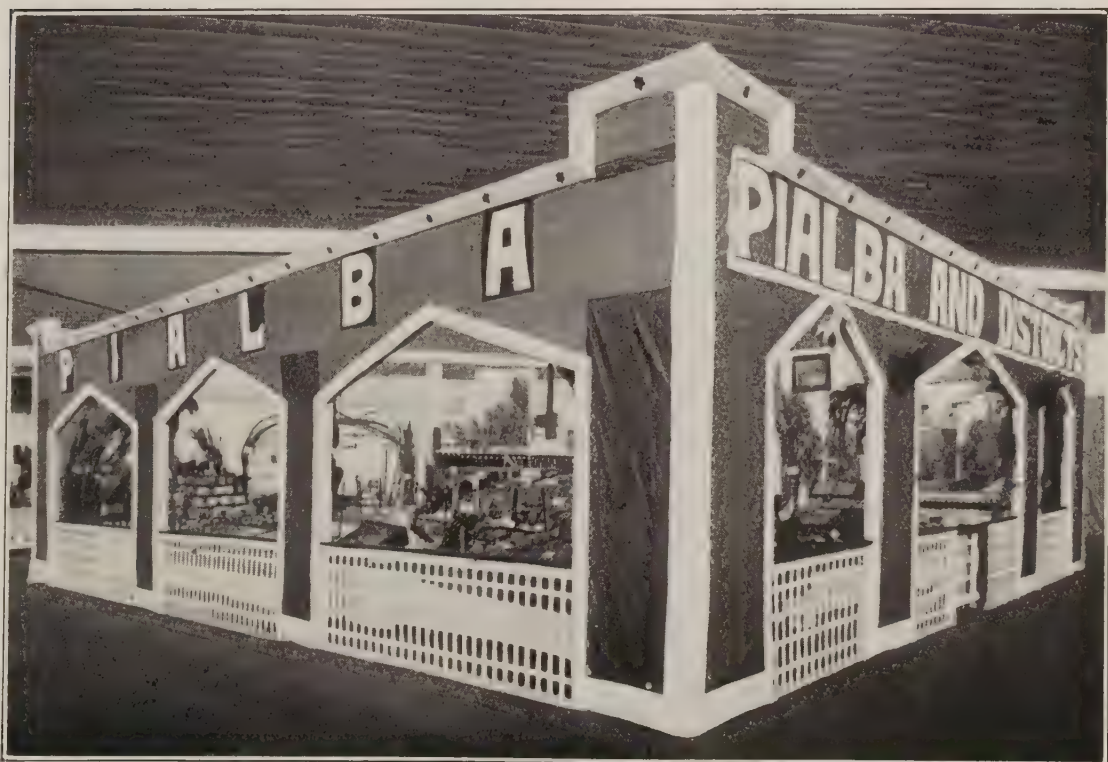


Photo : Dept. Agriculture and Stock.]

PLATE 39.—PIALBA DISTRICT EXHIBIT, FIRST IN "B" GRADE.

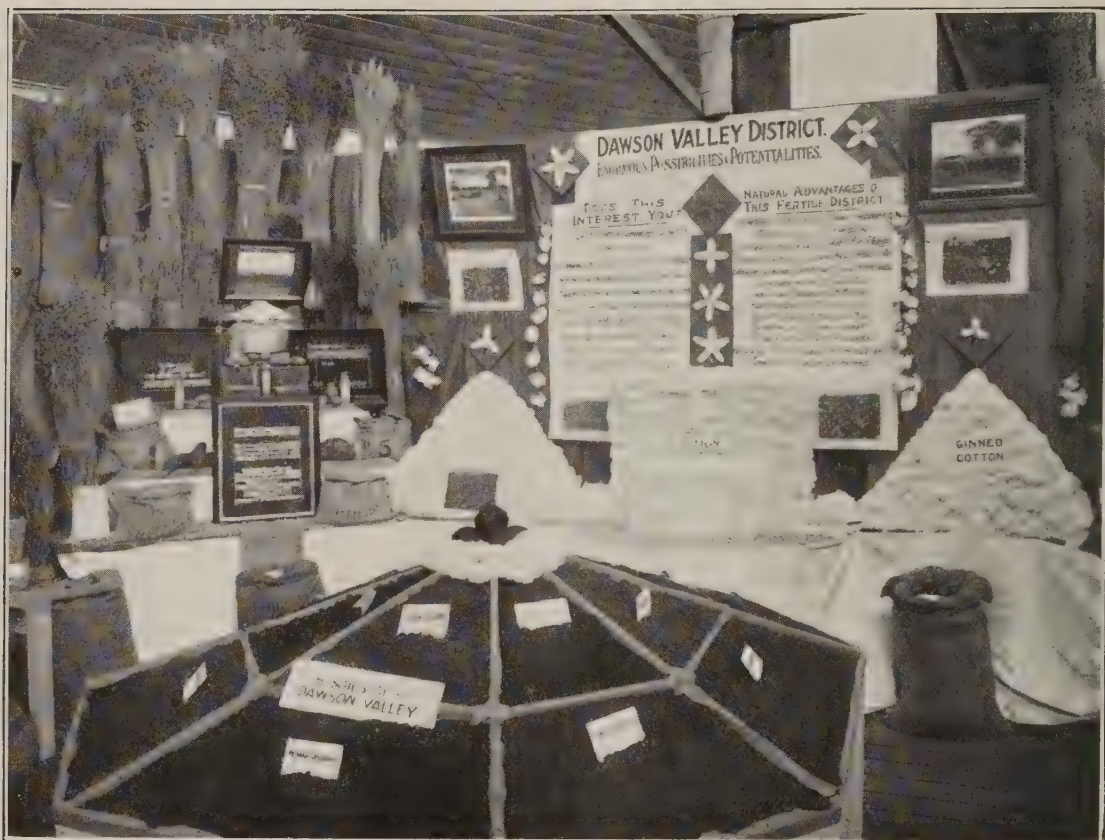


Photo : Dept. Agriculture and Stock.]

PLATE 40.—DAWSON VALLEY EXHIBIT.



Photo : Dept. Agriculture and Stock.]

PLATE 41.—WINNING EXHIBIT, ONE MAN FARM COMPETITION.

THE BOTANICAL DIVISION.

Weeds.

A representative collection of weeds, a source of trouble to horticulturists, agriculturists, and pastoralists throughout the State, was among the departmental displays. Most of these may be listed among the many undesirable importations from which Australia has suffered great economic loss. Many entered with seeds of economic plants, and by other agencies, such as straw for packing, and imported fodder. Some were introduced as ornamental garden plants, and having strayed from cultural control have become the pests we now find them. Among these are the billy goat weed, prickly poppy, and lantana. Some of the most obnoxious have been introduced for hedge-making, a disastrous example being the common prickly-pear. Hold-me-back or wait-a-while is another plant introduced for hedge-making that has become a curse in many scrub localities. Rank growing inkweeds, stinking rodger, wild cotton, and rag weeds are troublesome on newly-cleared and neglected cultivated lands, and of late years the federal weed, so called from its being first observed about the time of Federation, has spread on the newly-cleared scrub lands of the State. The khaki weed is an unwelcome visitor which is said to have been introduced from South Africa at the time of the Boer War, the needle-like burrs with which it is abundantly furnished cause great annoyance and detract from any fodder value the plant may possess. Quite a number in the collection may be termed noxious on account of their poisonous properties or harm they may cause to stock. Among these are the wall-flowered or heart-leaf poison bush, fuchsia bush, peach leaf poison, thorn apples, ironwood, and pimpernel. Many plants of the genus *Cassia* or Wild Sennas are continually being sent in as suspected of poisoning stock, the only harmful way in which these plants act, however, is as drastic purgatives. The question of plants poisonous or harmful to stock is one of the most complex that faces the botanist, veterinarian, and chemist alike, and one that calls for a good deal of scientific investigation in the State. Farmers and the public generally are once more reminded that the departmental officers are always willing and ready to report, free of charge, on any specimens of weeds, suspected poisonous plants, or other specimens forwarded to them. Each specimen in the collection is labelled with both the common and botanical names, and full information as to its properties and uses are supplied.

Grasses.

Queensland has always had a reputation for the richness of its pastures and the comprehensive collection of indigenous grasses and forage plants staged by the Department bears testimony that this distinction is fully justified. Among the *Andropogons* are the far-famed and fully appreciated blue grass and satin top, the former being one of the very best for fattening and grazing purposes, though not particularly drought resistant. The genus *Astrebla* comprises the highly-esteemed Mitchell grasses, of which four very distinct kinds are found in Queensland; the chief characteristic of these and some other of inland species of grasses and herbage is the tenacity of life which they possess, their drought resisting properties, and the rapid manner in which they respond to falls of rain after long periods of drought make their value in this respect nothing short of marvellous. Among the Star grasses, to the same genus of which belongs the imported Rhodes grass, are several varieties esteemed for their fodder value. The genus *Anthistira* contains the well-known kangaroo grass and a near ally of this is the Flinders grass, which in a green and a dry state is so much relished by stock. Blady grass although a coarse grower is eaten by stock when it is young, especially the new growth that follows a burn off. This grass is of economic importance from its value as material for paper making. Quite an array of panicums was on view, most of them possessing high feeding values. Beautiful grasses are various *Eragrostis* or love grasses. The button grass and the crow foot are cosmopolitan species, the first named being a most valuable sheep fodder. Brown top bears a good reputation among some stockowners. Several species of native *paspalum* were shown. Native sorghums are of large growth, but when cut both horses and cattle do well on them. Coastal grasses were represented by spinifex, coast couch, and several dune grasses useful as sand binders. Among the grasses especially adapted for wet or swampy situations are water couch, rice grass, *panicum proliferum*, *panicum obseptum* (a particularly good grass for wet places), and two sorts of *chamæraphus* or swamp couch.

Edible Trees and Shrubs.

Among the more remarkable and valuable features of Australian vegetation are the edible shrubs and trees of our inland scrubs and open country. The collection shown of about thirty sorts proved most interesting and instructive to stockowners, pastoralists, and agriculturists generally. Among the many sorts especially noted were the mulga, kurrajong, apple tree, wild orange, native pomegranate or bumbil, belah, emu bush, whitewood, myall, cattle bush, cotton bush, and



Photo: Dept. Agriculture and Stock.]

PLATE 42.—RESTING. A GLIMPSE OF THE JUDGING RING.



Photo: Dept. Agriculture and Stock.]

PLATE 43.—A POPULAR PRIZE-WINNER: NOT MUCH TO LOOK AT, BUT A
“BLUE RIBBAND” WALKER.

various salt bushes. All these and others have helped to keep stock not only alive, but in good condition during prolonged dry spells. The conservation, propagation, and utilisation of these valuable plants is a matter of national importance.

In connection with these exhibits it is again emphasised that officers of the Department are always willing and ready to identify and report on any samples of grasses, fodder plants, weeds, and other botanical specimens about which farmers, pastoralists, or others may desire technical or scientific information.

THE SEED LABORATORY.

Commercial Seeds and Seeds of Poisonous Plants.

The Seed Laboratory exhibit comprised a collection of agricultural and vegetable seeds, ninety of the weed seeds most frequently found in commercial seeds, and stock foods. Tables had been prepared giving the purity and germination of both Australian grown and oversea seeds, with the names of the countries from which the latter were imported. A purity table also listed the principal weed seeds found in samples examined in the course of 1921-1922, and from which it was noted that the poisonous *Datura stramonium* (Thorn Apple) seeds were found in samples of foxtail millet, Japanese millet, Sudan grass, and in Queensland grown oats. Seeds of *Melilotus parviflora* (Hexham Scent), a butter and flour-tainting weed, were also discovered in samples of Cape barley, lucerne, and oats; they also frequently occur



Photo : Dept. Agriculture and Stock.]

in wheat. Another germination table showed that lucerne and black cowpeas often contain a large proportion of hard seeds; seeds with husks so impervious to moisture as to delay germination. When the quantity of hard seeds present exceed 10 per cent. it is obvious that the effective germination is greatly reduced.

Every one should know the purity and germination of the seed that it is intended to sell or sow, also its freedom from hard seeds, insect-infested seeds, or seeds of any plant imparting a taint to butter, or deleterious to the life and health of stock. These matters can only be decided by a scientific examination of a large and truly representative sample, drawn from the bulk in the sender's possession. Seeds constitute the most variable material that the farmer or merchant purchases, and the success or failure of a crop, or even succeeding crops, may be wholly determined by the condition of the seed sown. No one can afford to leave any doubtful point to chance, and it is but common prudence to ascertain the purity and germination of all seeds before sowing or offering them for sale.

Samples of any seeds purchased or offered for sale as seeds for sowing may be sent to the Department of Agriculture for analysis. It is important that the sender's name and address be plainly written on each sample sent, and the parcel should be accompanied by a covering letter, addressed to the Under Secretary, Department of Agriculture and Stock, Brisbane. The weight of samples must not be less than 8 oz. of barley, cowpeas, beans, maize, tares, oats, wheat; 4 oz. of lucerne, sorghum, sorghum Sudanese (Sudan grass), millet, linseed, canary, prairie grass, cotton; 2 oz. of Rhodes grass, *paspalum dilatatum*, couch grass. A fee of 2s. 6d. is charged to vendors. A vendor is any person who sells, offers or contracts to sell, any seeds.

Free Analysis for Farmers.

* No charge is made to farmers in respect to samples of any seeds purchased by them for their own sowing, provided the following particulars are plainly written on each sample sent:—Vendor's name and address; name of seed; quantity purchased; date of delivery; locality where seed is to be sown; name and address of purchaser.

Better Seeds—Better Crops.

The best is the cheapest, whatever the price, and quality should be the one and only consideration that determines a purchase. An opinion as to the quality or condition of any agricultural seed is useless unless based on actual facts revealed by an analysis conducted by uniform scientific methods. This important work is undertaken by the Seed Laboratory of the Department of Agriculture.

ENTOMOLOGICAL AND RELATED EXHIBITS.

The section of the Departmental Court illustrating the activities of the Division of Economic Entomology and Plant Pathology, in charge of Mr. H. Tryon, comprised, as relating to the former, twenty-four cases displaying life-histories of several of our more formidable pests of the orchard and field, as well as those of some of our stock-injuring insects. Thus were brought under notice the potato ladybird, the potato tuber-miner, the potato green caterpillar, the sweet potato web-worm, the sweet potato weevil, the cabbage diamond moth caterpillar, the cabbage stem miner, the cabbage godara caterpillar, the cabbage prodenia caterpillar, the pumpkin beetle, the bean fly, the cereals armyworm, the grain weevil, the grain caterpillar, and the flour-eating caterpillar, the bean and pea weevils, the seven principal cotton-injuring insects. Among orchard pests were shown a series of citrus damaging insects, a series of citrus scale insects, the citrus stem-boring beetle, the so-called Queensland fruit fly, the banana weevil, the generally destructive peach moth (shown as affecting also almond, orange, loquat, guava, cherimoya, castor oil, cotton, and maize), the codlin moth. Stock injurious insects were illustrated by three cases showing sheep blowflies and their life phases and one devoted to the stock injuring "caterpillar" (a saw-fly larva).

These several life histories included not only specimens of the insects concerned, but also illustrations of their injuries and mode of action, indicated by models and water colour drawings, displaying life size and magnified representations. They were prepared by the two Entomologists, Messrs. E. H. Jarvis and H. Jarvis, under

the direction of the Entomologist-in-Chief, and evinced the highest technical skill and scientific discrimination.

Plant Diseases.

Plant diseases proper, restricted in the extent of their display by exigencies of space, were illustrated by coloured plates relating to the following maladies:—Citrus die back, C. black spot, C. fruit dwarfing, C. Maori disease, C. brown rot, C. bud suppression, citrus black spot and lemon scab, potato Irish blight of (a) foliage, (b) tuber, P. nematode root-gall, P. scab, blackleg, and potato leaf spot, apple bitter pit, and pineapple fruitlet core rot. In this case, the nature prints were made by Mr. H. W. Mobsby, F.R.S.A., whilst to Mr. H. Jarvis is due the colour portrayal.

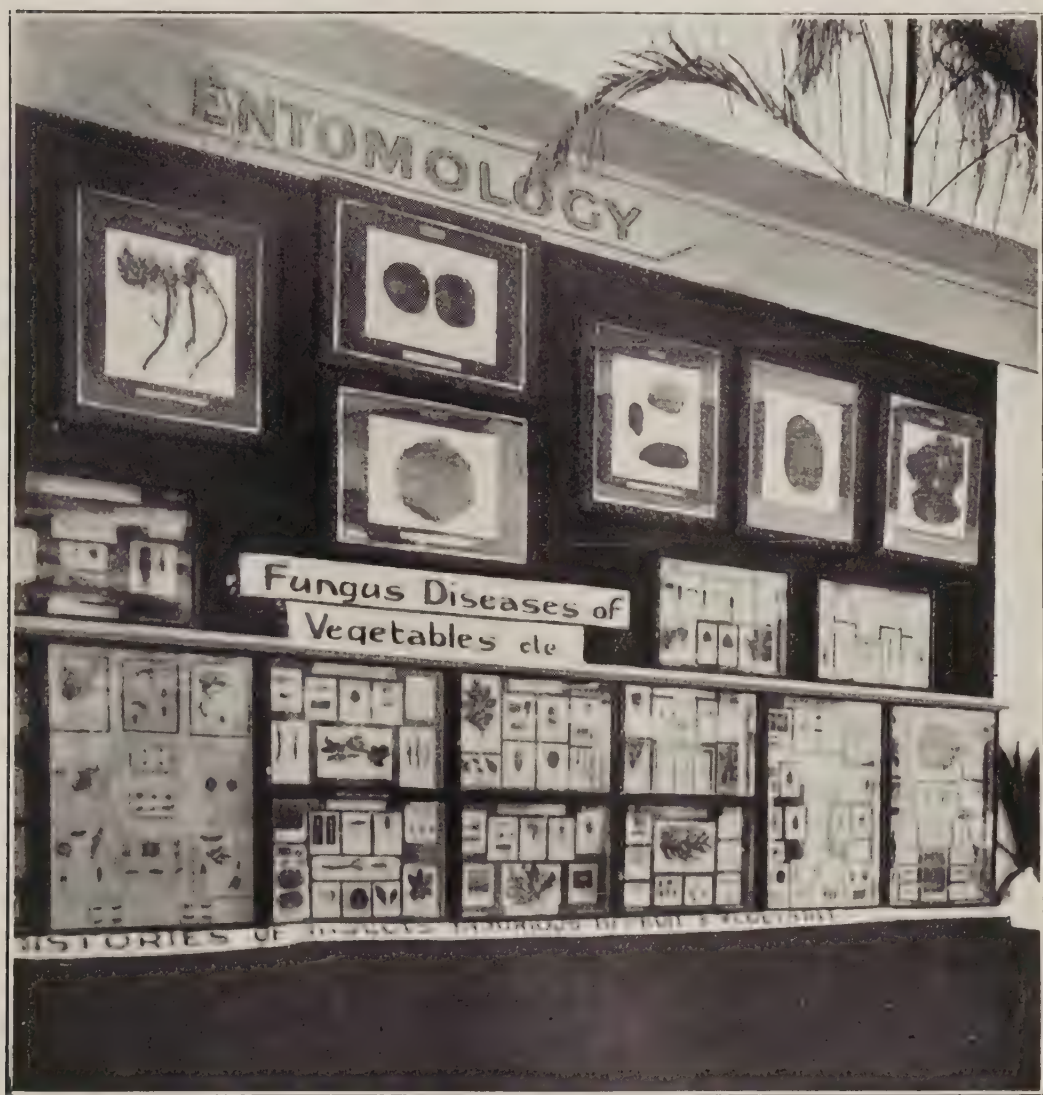


Photo : Dept. Agriculture and Stock.]

PLATE 45.—ENTOMOLOGICAL PANEL, COURT OF THE DEPARTMENT OF AGRICULTURE AND STOCK.

Banana Weevil Borer.

Distinct from the foregoing was a special stand devoted to this insect in charge of Mr. J. L. Froggatt B.Sc., entomologist in charge of banana beetle-borer investigations. This exhibit not only showed the beetle in all stages of its life history, actual living specimens supplementing others, but illustrations of its injuries and several modes of occurrence. As, in the case of the foregoing entomological and pathological exhibits, this section was evidently fully appreciated for its immense educational value.



PLATE 46.—FIRST IN THE EQUESTRIENNE TEAMS COMPETITION.
THE BRISBANE TEAM.



PLATE 47.—ROMA TEAM, SECOND.



PLATE 48.—BEST AMATEUR LADY RIDER: MISS SUSAN SPENCER.



PLATE 49.—WINNER OF THE LADIES' HUNT: MISS WARD.



PLATE 50.—A. D. MCKAY'S "JACK," CHAMPION HACK: MISS MULLEN, RIDER.



PLATE 51.—"BEN ARNOLD," SEVEN YEARS CHAMPION HACK.
The old horse, winner of many Championships at Brisbane and other Shows, died at the end of June.

DISTRICT EXHIBITS.**PRIMARY PRODUCTS AND MANUFACTURES.**

The result in the award in the primary products and manufactures, or "A" grade exhibits, was a triumph for the West Moreton District, which won the coveted honour for the second year in succession with the very fine aggregate of 1,213 points out of a possible 1,558. Its only opponent—Wide Bay and Burnett—secured an aggregate of 816 points. The success of West Moreton can be better gauged from the fact that in 1921 its exhibit won with an aggregate of 1,094½, so that, notwithstanding the chief organiser's optimistic opinion that he had a 50-point better exhibit this year, he has done much better than he anticipated. It was indeed a very fine victory for those associated with the exhibit, and West Moreton will again hold the handsome Chelmsford Shield for twelve months. Wide Bay and Burnett's aggregate of 816 points was not so good as in 1921. The following detailed points, however, show the strong and weak sections of each of the two exhibits:—

	Possible Points.	West Moreton.	Wide Bay and Burnett.
(1) DAIRY PRODUCE—			
Butter, 1 box	90	88	89½
Milk, condensed, concentrated, or dried, and by-products	40	32	0
Cheese, 1 cwt.	60	50	46
Eggs, suitable for domestic use; 1 dozen of each variety	20	18	5
	210	188	140½
(2) FOODS—			
Hams and bacon	50	48	38
Rolled and smoked beef and mutton	20	20	8
Smallgoods and sausages, if smoked or preserved	10	10	8
Fish—smoked, preserved, and canned	10	7	3
Canned meats	25	25	0
Lard, tallow, and animal oils	20	20	8
All butchers' by-products, not included in any other part of scale of points	10	10	0
Honey and its by-products	20	20	19
Confectionery, factory made	10	10	6
Bread, buseuits, scones, and cakes, factory made	10	10	9
	185	180	99
(3) FRUITS, VEGETABLES, AND ROOTS—Fresh and Preserved—			
Fresh fruits—all kinds	60	39	51
Preserved fruits, jams, &c.	30	15	8
Dried fruits	20	6	6
Fresh Vegetables—all kinds, including table pumpkins, but excluding potatoes	25	20	5
Preserved and dried vegetables, pickles, sauces, &c.	10	5	0
Potatoes, English and sweet	40	30	15
Roots—all kinds—and their products, arrowroot, cassava, meal, &c., samples not less than 1 lb.	14	10	0
Cocanuts, peanuts, and other nuts	6	4	2
	205	129	81
(4) GRAIN, &C.—			
Wheat	50	40	8
Flour, bran, pollard, macaroni, and meals prepared therefrom	10	0	8
Maize	50	42	28
Maizena, meals, starch, glucose, and cornflours	10	3	2
Oats, rye, rice, barley, malt, pearl barley, and their meals	30	22	2
	150	107	48

DISTRICT EXHIBITS—*continued.*

	Possible Points.	West Moreton.	Wide Bay and Burnett.
(5) MANUFACTURES AND TRADES—			
All woodwork	30	28	23
All metal and ironwork.. .. .	30	25	27
Leather and all leather work and tanning	20	12	8
Manufactured woollen and cotton fibre	30	25	0
All tinwork	10	7	9
Artificial manures	10	6	5
Brooms and brushes	10	5	7
Manufactures not otherwise enumerated	15	13	10½
	155	121	89½
(6) MINERALS AND BUILDING MATERIALS—			
Gold, silver, copper, and precious stones	25	16	14
Coal, iron, other minerals, and salt	30	21	21
Stone, bricks, cement, marble, terra cotta	20	18	8
Woods—dressed, undressed, and polished, one face to be polished, one face to be dressed, and half of it polished, back to be rough, samples of wood to measure not less than 12 x 6 x 1 inch thick	25	23	22
	100	78	65
(7) TROPICAL PRODUCTS—			
Sugar-cane	60	40	50
Sugar (raw and refined)	20	12	10
Rum, spirits, and by-products.. .. .	10	5	5
Coffee (raw and manufactured), tea, and spices	10	9	6
Cotton (raw), and by-products	30	20	15
Rubber	10	0	0
Oils (vegetable)	10	8	0
	150	94	86
(8) WINES, & C.—			
Wines	15	15	10
Aerated and mineral spa water, vinegar, and cordials	10	8	9
	25	23	19
(9) TOBACCO—			
Tobacco, cigar and pipe, in leaf	20	10	0
(10) HAY, CHAFF, & C.—			
Oaten, wheaten, lucerne, and other hay	30	22	6
Grasses and their seeds	10	8	4
Oaten, wheaten, lucerne, and other chaffs	50	35	15
Ensilage and other prepared cattle fodder	20	16	0
Sorghum and millets, in stalk	10	6	8
Commercial fibres (raw and manufactured)	10	8	4
Pumpkins and other green fodder	10	7	3
Broom millet, ready for manufacture	10	6	6
Farm seeds, including canary seed	13	10	0
	163	118	46

DISTRICT EXHIBITS—*continued.*

	Possible Points.	West Moreton.	Wide Bay and Burnett.
(11) WOOL, &c.—			
Scoured wool	40	35	39
Greasy wool	60	55	50
Mohair	10	8	10
	110	98	99
(12) ENLARGED PHOTOGRAPHS—			
A maximum of 5 points will be awarded for enlarged photographs of district scenery and local raised live stock	5	3	0
(13) EFFECTIVE ARRANGEMENT—			
Comprehensiveness of view	30	24	19
Arrangement of sectional stands	15	12	8
Effective ticketing	20	14	8
General finish	15	14	8
	80	64	43
Totals	1,558	1,213	816

PRIMARY PRODUCTS ONLY.

The primary products only, or "B" Grade competition, provided an exceptionally close contest, and resulted in a win for the Pialba District with 809 points, Northern Darling Downs being runner up with 801 points, while the other three exhibits were all close up. Pialba District has gained distinction very early in its career, as this is the first occasion an exhibit has come from that district, and to defeat a strong district like the Northern Downs, which won in 1921, is no mean performance. It was unfortunate for Kingaroy to be again low down for effective arrangement, for this exhibit scored remarkably well in some of the other sections. Details are as follows:—

	Possible Points.	Gympie.	Kingaroy.	Maranoa.	Northern Darling Downs.	Pialba.
(1) DAIRY PRODUCE—						
Butter	90	88	87	85	88	80
Cheese	60	40	49	40	57	40
Eggs, for domestic use	20	12	12	10	8	16
	170	140	148	135	153	136
(2) FOODS—						
Hams, bacon, rolled, and smoked beef and mutton	50	10	25	15	30	35
Fish—smoked	10	5	2	3	3	8
Lard, tallow, and animal oils	15	7	12	10	8	10
Honey, and its by-products	25	22	11	16	15	25
Confectionery (home-made)	10	9	5	4	6	7
Biscuits, bread, cakes, and scones (home-made)	10	7	6	5	6	6
	120	60	61	53	68	91

DISTRICT EXHIBITS—continued.

	Possible Points.	Gympie.	K'ingaroy.	Maranoa.	Northern Darling Downs.	Pialba.
(3) FRUITS, VEGETABLES, AND ROOTS—						
Fresh and preserved—						
Fresh fruits—all kinds	60	50	16	25	20	53
Preserved fruit and jams, &c., prepared by farmer	20	15	14	14	14	10
Dried fruit, prepared by farmer ..	5	3	3	..	..	..
Fresh vegetables—all kinds, including table pumpkins, but excluding potatoes	25	12	8	20	15	18
Preserved and dried vegetables, pickles, sauces, &c.	10	4	8	7	6	5
Potatoes	40	16	28	18	16	25
Roots—all kinds—and their products, arrowroot, cassava meal, &c., samples not less than 1 lb. ..	10	4	3	..	2	6
Cocoanuts, peanuts, and other nuts ..	10	5	6	5	4	8
Vegetable seeds	10	5	8	5	6	7
	190	114	94	94	83	132
(4) GRAIN, &C.—						
Wheat	50	6	15	44	42	6
Flour, bran, pollard, macaroni, and meals prepared therefrom ..	10	4	4	8	8	3
Maize	50	32	44	25	25	25
Maizena, meals, starch, glucose, and cornflour	10	3	6	6	6	5
Oats, rye, rice, barley, malt, pearl barley, and their meals	30	10	25	12	12	10
	150	55	94	95	93	49
(5) WOODS—						
Woods, dressed, undressed, and polished, one face to be dressed, and half of it polished, back to be rough, samples to measure not less than 12 x 6 x 1 inch thick ..	25	22	20	16	23	20
Wattle bark	15	10	12	8	12	9
	40	32	32	24	35	29
(6) HIDES (1) AND HOME PRESERVED SKINS FOR DOMESTIC USE—						
Must be free from offensive smell ..	15	9	4	14	12	13
(7) TROPICAL PRODUCTS—						
Sugar-cane	60	16	20	..	..	45
Coffee, tea, and spices	10	4	3	..	..	6
Cotton (raw) and by-products ..	30	12	10	15	10	15
	100	72	33	25	10	66
(8) MINERALS—						
Gold, silver, copper, and precious stones	25	14	8	..	5	12
Coal, iron, and other minerals, and salt	30	15	16	9	16	23
	55	29	24	9	21	35

DISTRICT EXHIBITS—*continued.*

	Possible Points.	Gympie.	Kingaroy.	Maranoa.	Northern Darling Downs.	Pialba.
(9) TOBACCO—						
Tobacco (cigar and pipe), in leaf ..	20	5	5	10	15	4
(10) HAY, CHAFF, &c.—						
Lucerne, oaten, wheaten, and other hay	30	8	16	25	18	12
Grasses and their seeds	7	4	6	6	4	3
Oaten, wheaten, lucerne, and other chaffs	50	20	25	40	44	30
Ensilage and other prepared cattle fodder	20	12	12	15	14	10
Sorghum and millets	10	7	7	7	7	3
Commercial fibres	10	5	5	7	5	5
Pumpkins and other green fodder ..	10	6	8	8	8	6
Hemp and flax	10	5	7	4	5	3
Broom millet, ready for manufacture	10	6	4	4	6	2
Farm seeds, including canary seed ..	13	6	11	12	10	7
	170	79	101	128	121	81
(11) WOOL, &c.—						
Scoured wool	40	30	36	39	38	30
Greasy wool	60	40	54	60	58	45
Mohair	10	9	7	9	8	7
	110	79	97	108	104	82
(12) ENLARGED PHOTOGRAPHS—						
A maximum of 5 points will be awarded for enlarged photographs of district scenery and local breed live stock	5	1	2	1	3	1
(13) LADIES' WORK—						
Needlework,—knitting	25	13	21	25	18	20
Fine arts	5	2	5	3	2	3
School work, maps, writing, &c., for pupils of schools in the district..	15	4	10	2	11	..
	45	19	36	30	31	23
(14) EFFECTIVE ARRANGEMENT—						
Comprehensiveness of view	30	24	14	16	20	26
Arrangement of sectional stands ..	15	11	7	8	9	13
Effective ticketing	20	16	8	11	12	14
General finish	15	12	7	9	11	14
	80	63	36	44	52	67
Totals.. .. .	1,270	757	767	770	801	809

ONE-FARM EXHIBITS.

WON BY MR. K. HAAG.

The one-farm exhibit competition resulted in a triumph for Mr. K. Haag, who secured an aggregate of 470 points, with Mr. V. O. Williams, 437 points, second, and Mr. S. C. Klumpp, 365 points, third. Details:—

	Possible Points.	K. Haag.	S. C. Klumpp.	V. O. Williams.
(1) DAIRY PRODUCE—				
Butter, 6 lb.	25	23	22	23
Cheese, 1 large or 2 small (home-made) . .	20	18	8	14
Eggs, suitable for domestic use, 1 dozen each variety	5	4½	5	4½
	50	45½	35	41½
(2) FOODS—				
Hams, 15 lb. ; bacon, 15 lb. (home cured) . .	20	17	15	14
Corned, smoked, and spiced beef and mutton, 10 lb.	10	8	8	8
Honey, 12 lb.	10	10	10	8
Beeswax, 6 lb.	5	5	5	2
Bread, 2 loaves ; scones, 1 dozen	5	3	4	5
Confectionery and sweets, 3 lb.	5	4	3	4
Cakes and biscuits	5	4	3	4
Lard, tallow, oils	5	4	4	4
	65	55	52	49
(3) FRUITS, VEGETABLES, AND ROOTS :				
(Fresh and Preserved)—				
Fresh fruits, all kinds	25	11	17	9
Dried fruits	10	7	6	9
Preserved fruits and jams	15	15	13	14½
Fresh vegetables	15	12	10	5
Pickles, sauces, &c.	15	14	12	13
Potatoes, not less than 28 lb. (or a collection), and roots	25	20	15	22
Table pumpkins, squashes, and marrows, 56 lb.	10	10	7	10
Cocoanuts and nuts	3	1	1	1
Vegetable and garden seeds	5	3	3	5
Arrowroot, 10 lb.	5	5	5	2
Sugar beet, 3 lb.	5	4	2	2
Cassava, 3 lb.	5	4	4	..
Ginger, 3 lb.	5	5	..	..
	143	111	95	92½
(4) GRAIN, &C.—				
Wheat	25	23	7	12
Maize	20	18	10	18
Barley, oats, rye, and rice	20	15	..	16
	65	56	17	46
(5) TROPICAL PRODUCTS—				
Sugar-cane, 24 stalks or 1 stool	30	25	25	2
Cotton, in seed, 10 lb., long staple . .	10	8	6	5
Coffee, 10 lb.	5	..	5	3
	45	33	36	10
(6) TOBACCO—				
Tobacco leaf, dried, 5 lb.	10	..	6	5

ONE-FARM EXHIBIT—*continued.*

	Possible Points.	K. Haag.	S. C. Klump.	V. O. Williams.
(7) HAY, CHAFF, &C.—				
Hay, oaten, wheaten, lucerne, and other varieties	20	18	10	20
Grasses and their seeds, including canary ..	10	9	7	9
Chaff, oaten, wheaten, lucerne, and other varieties	20	18	16	18
Ensilage, any form	15	12	10	15
Cattle fodder (pumpkins and green fodder)	15	15	10	14
Sorghum and millet	10	10	4	8
Hemp, 5 lb.	5	3	3	5
Flax, 5 lb.	5	4	3	4
Cow pea seed, 7 lb.	7	7	..	5
Brown millet, 10 lb.	10	10	10	7
	117	106	73	105
(8) WOOL—				
Greasy, 5 fleeces	20	..	..	16
Mohair	5	5	..	4
	25	5	..	20
(9) DRINKS, &C.—				
Temperance drinks, 6 bottles	10	8	4	4
(10) WOMEN'S AND CHILDREN'S WORK—				
Needlework, knitting	10	4	6	4
Fine arts	5	2	..	3
Fancy work	15	8	12	10
School work, maps, writing, &c.	10	..	1	8
	40	14	19	25
(11) MISCELLANEOUS—				
Articles of commercial value	5	2½	2	5
(12) PLANTS AND FLOWERS—				
In pots	5	5	3½	4
(13) TIME AND LABOUR- SAVING USEFUL ARTICLES—				
Made on the farm	10	3	5	3
(14) EFFECTIVE ARRANGEMENT OF EXHIBITS—				
Comprehensiveness of view	10	9	6	8
Arrangement of stands	5	4	3	5
Effective ticketing	5	5	3	5
General finish	10	8	6	9
	30	26	18	27
Totals	620	470	365	437

BUTTER EXHIBITS.**GRANTHAM TAKES EXPORT CLASSES.**

The Queensland Farmers' Co-operative Company, Limited, at Grantham, took first prize with 95½ points, the Dalby factory of the Downs Co-operative Dairy Company Limited was second with 95 points, and the Clifton factory of the same concern third with 94½ points.

Following are the details:—

EXPORT BUTTER (30 DAYS' STORAGE).

Class 8.

One box butter (salted), most suitable for export, to be stored thirty clear days prior to 7th August, 1922.

ONE BOX (SALTED), 30 DAYS' STORAGE.

	Flavour.	Texture.	Colour.	Saltng.	Packing.	Total.
Possible points	65	20	7	4	4	100
Queensland Farmers' Co-operative Co., Ltd., Grantham	61	20	7	4	3½	95½
Downs Co-operative Dairy Co., Ltd., Dalby	60	20	7	4	4	95
Downs Co-operative Dairy Co., Ltd., Clifton	60	19½	7	4	4	94½
Queensland Farmers' Co-operative Co., Ltd., Boonah	59	20	7	4	4	94
Caboolture Co-operative Dairy Co., Ltd.	59	20	7	4	3½	93½
Gayndah Co-operative Dairy Co., Ltd.	59	20	7	4	3½	93½
Goombungee Co-operative Dairy Co., Ltd.	58	20	7	4	4	93
Maryborough Co-operative Dairy Co., Ltd., Maryborough	58	20	7	4	4	93
Maryborough Co-operative Dairy Co., Ltd., Kingaroy	59	20	6½	4	3½	93
Murrumbidgee Irrigation Dairy Farmers' Co-operative Co., Ltd.	60	20	5	4	4	93
Logan and Albert Co-operative Co., Ltd.	58	20	7	4	3½	92½
Queensland Farmers' Co-operative Co., Ltd., Laidley	58	20	7	4	3½	92½
Stanley River Co-operative Co., Ltd.,	58	20	7	4	3	92
Queensland Farmers' Co-operative Co., Ltd., Booval	57	20	7	4	3½	91½
Terror's Creek and Samson Vale Co., Ltd.	58	19	7	4	3	91
Wide Bay Co-operative Dairy Co., Ltd., Gympie	58	19	7	4	3	91
Maleny Co-operative Dairy Co., Ltd.	56	20	7	4	3½	90½
Wide Bay Co-operative Dairy Co., Ltd., Cooroy	56	20	7	4	3	90
Ballina Co-operative Preserving Co., Ltd.	55	20	7	4	3½	89½
Kin Kin Co-operative Dairy Co., Ltd.	54	20	7	4	3½	88½
South Burnett Co-operative Dairy Co., Ltd.	54	20	7	4	3½	88½

BUTTER EXHIBITS—*continued.*

ONE BOX (UNSALTED), 8 WEEKS' STORAGE.

One box butter (unsalted), most suitable for export, to be stored eight weeks prior to 7th August.

	Flavour.	Texture.	Colour.	Packing.	Total.
Possible points	65	20	7	4	96
Downs Co-operative Dairy Co., Ltd., Dalby ..	61	20	7	4	92
Ballina Co-operative Preserving Co., Ltd. ..	61	20	7	3½	91½
Downs Co-operative Dairy Co., Ltd., Clifton ..	60	20	7	4	91
Downs Co-operative Dairy Co., Ltd., Crow's Nest	60	19½	7	4	90½
Maryborough Co-operative Dairy Co., Ltd., Kingaroy	61	20	6½	3	90½
Queensland Farmers' Co-operative Co., Ltd., Boonah	60	20	6½	4	90½
Gayndah Co-operative Dairy Co., Ltd.	59	20	7	4	90
Nanango Co-operative Dairy Co., Ltd.	60	20	6	4	90
Queensland Farmers' Co-operative Co., Ltd., Booval	60	20	6½	3½	90
Queensland Farmers' Co-operative Co., Ltd., Laidley	60	20	6½	3½	90
Caboolture Co-operative Dairy Co., Ltd.	59	20	6½	4	89½
Wide Bay Co-operative Dairy Co., Ltd., Gympie ..	59	19½	7	3½	89
Oakey Co-operative Dairy Co., Ltd.	59	20	7	3½	89½
Queensland Farmers' Co-operative Co., Ltd., Grantham	60	20	6	3½	89½
Logan and Albert Co-operative Dairy Co., Ltd. ..	58	20	7	3½	88½
Maryborough Co-operative Dairy Co., Ltd., Mary- borough	58	20	6½	4	88½
Warwick Butter and Dairying Co., Ltd., Mill Hill	58	20	7	3½	88½
Goombungee Co-operative Dairy Co., Ltd.	57	20	7	4	88
Wide Bay Co-operative Dairy Co., Ltd., Cooroy ..	58	19½	7	3½	88
Terror's Creek and Samson Vale Dairy Co., Ltd. ..	58	19½	6½	3	87
Maleny Co-operative Dairy Co., Ltd.	56	19½	7	4	86½
South Burnett Co-operative Dairy Co., Ltd. ..	57	20	6½	3	86½

EIGHT WEEKS' STORAGE.

Class 10.

One box butter (salted), suitable for export, to be kept in cold stores not less than eight weeks prior to 7th August.

ONE BOX (SALTED), 8 WEEKS' STORAGE.

	Flavour.	Texture.	Colour.	Salting.	Packing.	Total.
Possible points	65	20	7	4	4	100
Downs Co-operative Dairy Co., Ltd., Dalby	60	20	7	4	4	95
Warwick Butter and Dairy Co., Ltd., Allora	59	20	7	4	4	94
Stanley River Co-operative Co., Ltd.	59	20	7	4	3½	93½
Ballina Co-operative Preserving Co., Ltd.	58	20	7	4	4	93
Gayndah Co-operative Dairy Co., Ltd.	58	20	7	4	4	93
Logan and Albert Co-operative Dairy Co., Ltd.	58	20	7	4	4	93
Queensland Farmers' Co-operative Co., Ltd., Boonah	58	20	7	4	4	93
Queensland Farmers' Co-operative Co., Ltd., Booval	58½	20	7	4	3½	93
Queensland Farmers' Co-operative Co., Ltd., Laidley	59	20	7	4	3	93
Wide Bay Co-operative Dairy Co., Ltd., Gympie	58	20	7	4	4	93

BUTTER EXHIBITS—*continued.*ONE BOX (SALTED), 8 WEEKS' STORAGE—*continued.*

	Flavour.	Texture.	Colour.	Salting.	Packing.	Total.
Possible points	65	20	7	4	4	100
Oakey Co-operative Dairy Co., Ltd. . .	59	19	7	4	3½	92½
Queensland Farmers' Co-operative Co., Ltd., Grantham	58	20	7	4	3½	92½
Maryborough Co-operative Dairy Co., Ltd., Kingaroy	57	20	7	4	4	92
Wide Bay Co-operative Dairy Co., Ltd., Cooroy	58	19	7	4	4	92
Caboolture Co-operative Dairy Co., Ltd. . .	58	19	7	4	3½	91½
Downs Co-operative Dairy Co., Ltd., Clifton	57	20	7	4	3½	91½
Goombungee Co-operative Dairy Co., Ltd. . .	57	19½	7	4	4	91½
Nanango Co-operative Dairy Co., Ltd. . .	57	20	6½	4	4	91½
Downs Co-operative Dairy Co., Ltd., Crow's Nest	56	20	7	4	4	91
Warwick Butter and Dairying Co., Ltd., Mill Hill	57	19½	7	4	3½	91
Maleny Co-operative Dairy Co., Ltd. . .	56	19½	7	4	4	90½
Maryborough Co-operative Dairy Co., Ltd., Maryborough	56	19½	6½	4	4	90
South Burnett Co-operative Dairy Co., Ltd. . .	56	19½	7	4	3½	90
Terror's Creek and Samson Vale Dairy Co., Ltd.	57	10	7	4	3	90

FRESH BUTTER.

The following are the awards in the fresh butter classes:—

ONE BOX, FACTORY MAKE, LOCAL CONSUMPTION.

	Flavour.	Texture.	Colour.	Salting.	Packing and Finish.	Total.
Possible points	65	20	7	4	4	100
Queensland Farmers' Co-operative Dairy Co., Ltd., Grantham	61	20	7	4	4	96
Queensland Farmers' Co-operative Dairy Co., Ltd., Booval	60½	20	7	4	4	95½
Logan and Albert Co-operative Dairy Co., Ltd.	60	20	7	4	4	95
Downs Co-operative Dairy Co., Ltd., Crow's Nest	60	20	7	4	3½	94½
Queensland Farmer's Co-operative Dairy Co., Ltd., Laidley	60	19½	7	4	4	94½
South Burnett Co-operative Dairy Co., Ltd. . .	61	19½	6½	4	3½	94½
Maryborough Co-operative Dairy Co., Ltd., Kingaroy	60	20	6½	4	3½	94
Wide Bay Co-operative Dairy Co., Ltd., Gympie	61	19½	6½	3½	3½	94
Nanango Co-operative Dairy Co., Ltd. . .	60	19½	6½	4	3½	93½
Queensland Farmers' Co-operative Dairy Co., Ltd., Boonah	59½	20	7	3½	3½	93½
Scone Co-operative Dairy Co., Ltd. . .	59	20	7	4	3½	93½
Ballina Co-operative Preserving Co., Ltd. . .	59	19½	7	4	3½	93

FRESH BUTTER—*continued.*ONE BOX, FACTORY MAKE, LOCAL CONSUMPTION—*continued.*

	Flavour.	Texture.	Co'our.	Salting.	Packing and Finish.	Total.
Poss ble points	65	20	7	4	4	100
Wide Bay Co-operative Dairy Co., Ltd., Cooroy	59	19½	7	4	3½	93
Kin Kin Co-operative Dairy Co., Ltd. ..	59	19½	6½	4	3½	92½
Oakey Co-operative Dairy Co., Ltd. ..	60	19	7	3½	3	92½
Stanley River Co-operative Dairy Co., Ltd.	59	19½	6½	4	3½	92½
Maryborough Co-operative Dairy Co., Ltd., Maryborough	58	19	7	4	4	92
Downs Co-operative Dairy Co., Ltd., Dalby	57	20	6½	4	4	91½
Terror's Creek and Samson Vale Dairy Co., Ltd.	59½	18½	6½	4	3	91½
Gayndah Co-operative Dairy Co., Ltd. ..	57	19½	6½	4	4	91
Goombungee Co-operative Dairy Co., Ltd.	58	19	7	4	3	91
Warwick Butter and Dairying Co., Ltd., Allora	58	19	7	3½	3½	91
Caboolture Butter and Dairying Co., Ltd., Pomona	58	19	6½	4	3½	91
Maleny Co-operative Dairy Co., Ltd. ..	57	19½	6½	4	3	90

SPECIAL AWARD FOR THE FACTORY SECURING THE GREATEST AGGREGATE NUMBER OF POINTS FOR ALL CLASSES OF BUTTER.

	30 Days' Storage.	8 Weeks' Unsalted.	8 Weeks' Salted.	Fresh Butter.	Total.
Downs Co-operative Dairy Co., Ltd., Dalby ..	95	92	95	91½	373½
Queensland Farmers' Co-operative Dairy Co., Ltd., Grantham	95½	89½	92½	96	373½
Queensland Farmers' Co-operative Dairy Co., Ltd., Boonah	94	90½	93	93½	371
Downs Co-operative Dairy Co., Ltd., Crow's Nest	94	90½	91	94½	370
Queensland Farmers' Co-operative Dairy Co., Ltd., Booval	91½	90	93	95½	370
Queensland Farmers' Co-operative Dairy Co., Ltd., Laidley	92½	90	93	94½	370
Maryborough Co-operative Co., Ltd., Kingaroy ..	93	90½	92	94	369½
Logan and Albert Co-operative Dairy Co., Ltd. ..	92½	88½	93	95	369
Gayndah Co-operative Dairy Co., Ltd.	93½	90	93	91	367½
Wide Bay Co-operative Dairy Co., Ltd., Gympie	91	89	93	94	367
Ballina Co-operative Preserving Co., Ltd. ..	89½	91½	93	93	367
Goombungee Co-operative Dairy Co., Ltd. ..	93	88	91½	91	363½
Maryborough Co-operative Dairy Co., Ltd., Mary- borough	93	88½	90	92	363½
Wide Bay Co-operative Dairy Co., Ltd., Cooroy	90	88	92	93	363
South Burnett Co-operative Dairy Co., Ltd. ..	88½	86½	90	94½	359½
Terror's Creek and Samson Vale Dairy Co., Ltd.	91	87	90	91½	359½
Maleny Co-operative Dairy Co., Ltd.	90½	86½	90½	90	357½
Stanley River Co-operative Dairy Co., Ltd. ..	92	..	93½	92½	278
Downs Co-operative Dairy Co., Ltd., Clifton ..	94½	91	91½	..	277
Nanango Co-operative Dairy Co., Ltd. .. ..	..	90	91½	93½	275
Oakey Co-operative Dairy Co., Ltd. .. ..	..	89½	92½	92½	274½
Kin Kin Co-operative Dairy Co., Ltd.	88½	..	..	92½	181
Warwick Butter and Dairying Co., Ltd., Mill Hill	..	88½	91	..	179½
The Scone Co-operative Dairy Co., Ltd. .. ..	..	..	..	93½	93½

CHEESE—EXPORT CLASSES.

The following are the awards in the export cheese classes:—

Two export cheeses, 70-80 lb. (not more than three weeks old prior to storing), white, suitable for English market:—

	Flavour.	Texture.	Colour.	Finish.	Total.
Possible points	50	25	15	10	100
Pittsworth Dairy Co., Ltd., Pittsworth	44½	25	15	10	94½
Pittsworth Dairy Co., Ltd., Factory	44	24½	15	9½	93
Goombungee Co-operative Dairy Co., Ltd. ..	42½	24½	15	9½	91½
Biddeston Co-operative Dairy Co., Ltd.	30	24½	14½	10	88
Maryborough Co-operative Dairy Co., Ltd., Brook-lands	38½	24½	14½	9½	87
Carlyle Cheese Factory	38	24½	14½	9½	86½
Warwick Butter and Dairying Co., Ltd., Grey Mare	38	24	14	9½	85½
Downs Co-operative Dairy Co., Ltd., Hodgson's Vale	38½	24	14	8½	85

Two export cheeses, 70-80 lb. (not more than three weeks old prior to storing); coloured, suitable for English market:—

Possible points	50	25	15	10	100
Pittsworth Co-operative Dairy Co., Ltd., Pitts- worth	45½	25	14½	10	95
Woodleigh Cheese Factory	43½	24½	15	9	92
Pittsworth Dairy Co., Ltd., Springsure	41	25	14½	10	91½
Biddeston Co-operative Dairy Co., Ltd.	42½	24½	14½	9½	91
Malling Cheese Factory	42	24½	15	9½	91
Maryborough Co-operative Dairy Co., Ltd., Brook-lands	42	24½	14½	9½	90½
Mount Tyson Farmers' Co., Ltd.	42	24½	14½	9	90
Warwick Butter and Dairying Co., Ltd., Grey Mare	41	24½	14½	9½	89½
Carlyle Cheese Factory	39	24½	14½	9½	87½
Goombungee Co-operative Dairy Co., Ltd. ..	37	24½	14½	9½	85½
Downs Co-operative Dairy Co., Ltd., Hodgson's Vale	38½	24	14	8½	85

Two medium cheeses, not exceeding 40 lb.; age, over two and under three months:—

Possible points	50	25	15	10	100
Malling Cheese Factory	44	25	15	9½	93½
Pittsworth Dairy Co., Ltd., Pittsworth	44	25	14½	9½	93
Downs Co-operative Dairy Co., Ltd., Hodgson's Vale	44	24½	14½	9½	92½
Warwick Butter and Dairying Co., Ltd., Lord John Swamp	43½	24½	14½	9½	92
Carlyle Cheese Factory	43½	24½	14½	9	91½
Goombungee Co-operative Dairy Co., Ltd. ..	42½	25	14½	9½	91½
Warwick Butter and Dairying Co., Ltd., Elbow Vale	43	24½	14½	9½	91½
Merrimac Cheese Factory	42	24½	14½	10	91
Warwick Butter and Dairying Co., Ltd., Grey Mare	42	24½	14½	9½	90½
Mount Tyson Farmers' Co-operative Dairy Co., Ltd.	41½	24½	14½	9½	90
G. W. Stanley	41	24½	14½	9½	89½
Warwick Butter and Dairying Co., Ltd., Victoria Hill	40	24½	15	9½	89
Southbrook Co-operative Dairy Co., Ltd. ..	39	24½	14½	9	87
Warwick Butter and Dairy Co., Ltd., Bony Mountain	38	24½	14½	9½	86½
Rosalie Cheese Factory	38½	24	14½	9	86

CHEESE—EXPORT CLASSES—*contin^d ed.*

Two medium cheeses, not exceeding 40 lb.; age, over six weeks and under two months :—

	Flavour.	Texture.	Colour.	Finish.	Total.
Possible points	50	25	15	10	100
Pittsworth Dairy Co., Ltd., Pittsworth	45½	25	15	9½	95
Malling Cheese Factory	44	25	15	10	94
Mount Tyson Farmers' Co-operative Dairy Co., Ltd.	44	25	14½	9½	93
Warwick Butter and Dairying Co., Ltd., Bony Mountain	44	24½	15	9	92½
Downs Co-operative Dairy Co., Ltd., Hodgson's Vale	42½	24½	14½	9½	91
Pittsworth Dairy Co., (46A)	41½	24½	15	9½	90½
Pittsworth Dairy Co. (46B)	42	24½	14½	9½	90½
Warwick Butter and Dairying Co., Ltd., Victoria Hill	42	24½	14½	9½	90½
Carlyle Cheese Factory	41	24½	14½	10	90
Goombungee Co-operative Co., Ltd.	41	25	14½	9½	90
Pittsworth Dairy Co. (46C)	41½	24½	14½	9½	90
Warwick Butter and Dairying Co., Ltd., Elbow Valley	41½	24	14½	9½	89½
Warwick Butter and Dairying Co., Ltd., Lord John Swamp	41	24	14½	9½	89
Warwick Butter and Dairying Co., Ltd., Grey Mare	40	24½	14½	9½	88½
Southbrook Co-operative Dairy Co., Ltd.	40	24	14½	9½	88

Two loaf cheeses, not exceeding 12 lb.; age, over two months and under three months :—

	50	25	15	10	100
Possible points	50	25	15	10	100
Warwick Butter and Dairying Co., Ltd., Bony Mountain	45	24½	15	9½	94
Pittsworth Dairy Co., Ltd., Pittsworth	44	25	15	9½	93½
Malling Cheese Factory	44	24½	15	9½	93
Mount Tyson Farmers' Co-operative Dairy Co., Ltd.	43	24½	14½	9½	91½
Warwick Butter and Dairying Co., Ltd., Elbow Vale	42	24½	14½	10	91
Warwick Butter and Dairying Co., Ltd., Grey Mare	42½	24½	14½	9½	91
Warwick Butter and Dairying Co., Ltd., Lord John Swamp	42½	24½	14½	9½	91
Merrimac Cheese Factory	41½	24½	14½	10	90½
Downs Co-operative Dairy Co., Ltd., Hodgson's Vale	41	24½	14½	10	90
G. W. Stanley	41½	24½	14½	9½	90
Carlyle Cheese Factory	41	24½	14½	9½	89½
Warwick Butter and Dairying Co., Ltd., Victoria Hill	40	24½	14½	9½	88½
Southbrook Co-operative Dairy Co., Ltd.	39	24½	14½	10	88
Goombungee Co-operative Dairy Co., Ltd.	38	25	14½	9½	87
Rosalie Cheese Factory	38½	24	14½	9½	86½

CHEESE—EXPORT CLASSES—*continued.*

Two loaf cheeses, not exceeding 12 lb.; age, over six weeks and under two months:—

	Flavour.	Texture.	Colour.	Finish.	Total.
Possible points	50	25	15	10	100
Pittsworth Dairy Co., Ltd., Pittsworth	44	25	15	9½	93½
Mount Tyson Farmers' Co-operative Dairy Co., Ltd.	44	24½	15	9½	93
Malling Cheese Factory	43	24½	15	10	92½
Carlyle Cheese Factory	42	24½	14½	10	91
Pittsworth Dairy Co., Ltd. (80A)	41½	24½	15	10	91
Pittsworth Dairy Co., Ltd. (80B)	42½	24½	14½	9½	91
Warwick Butter and Dairy Co., Ltd., Bony Mountain	42½	24½	14½	9½	91
Goombungee Co-operative Dairy Co., Ltd. ..	41½	24½	15	9	90
Pittsworth Dairy Co., Ltd. (80c)	41½	24½	14½	9½	90
Warwick Butter and Dairying Co., Ltd., Elbow Valley	41½	24½	14½	9½	90
Warwick Butter and Dairying Co., Ltd., Lord John Swamp	41½	24½	14½	9½	90
Downs Co-operative Dairy Co., Ltd., Hodgson's Vale	41	24½	14½	9½	89½
Southbrook Co-operative Dairy Co., Ltd. ..	40½	24	14½	9½	88½
Warwick Butter and Dairying Co., Ltd., Grey Mare	38	25	15	9½	87½
Warwick Butter and Dairying Co., Ltd., Victoria Hill	38	25	15	9½	87½
G. W. Stanley	39	24	14½	9½	87

TROPHY OF CHEESE.

	Export.	Medium.	Loaf.	Total.
Possible points	100	100	100	300
Downs Co-operative Dairy Co., Ltd., Hodgson's Vale ..	91	91	93	275
Carlyle Cheese Factory	89	89	86	264

HOME MILKING.**RESULT OF COMPETITIONS.**

Home-milking competitions were conducted on farms under the supervision of officers of the Department of Agriculture, the conditions being the greatest yield of butter-fat for twenty-four hours under Babcock test, milk to contain an average not less than 3.3 per cent. of butter-fat. The following are the results:—

		Milk. Lb.	Test.	Com- mercial Butter.
<i>Jerseys.</i>				
E. Burton's Oxford Buttercup IV.	N.	16	5.8	1.09
	M.	18	5.0	1.06
	N.	16½	6.7	1.30
		..	..	3.45
T. Mullen's Lady Lass III.	M.	23	5.25	1.415
	E.	23	5.25	1.415
		..	..	2.83
E. Burton's Oxford Golden Buttercup	N.	13	5.8	0.89
	M.	13½	4.4	0.695
	N.	12	5.0	0.70
		..	..	2.285
<i>Illawarra Milking Shorthorns.</i>				
R. Mears' Tulip of Morden	E.	18	5.4	1.15
	M.	24.5	3.6	1.02
	N.	21	5.5	1.36
		..	..	3.53
J. F. Cochrane's Trixie of Newholme	M.	34	3.6	1.43
	E.	29	5.6	1.91
		..	..	3.34
B. O'Connor's Fairy Queen 2nd of Glenthorne ..	M.	23.5	4.1	1.13
	N.	24	3.7	1.04
	E.	26	3.8	1.16
		..	..	3.33
B. O'Connor's Dahila II.	E.	21	3.9	0.96
	M.	27	3.0	0.94
	N.	24	4.3	1.20
		..	..	3.10
E. D. Lawley's Lorna of Arley	M.	27.5	4.0	1.28
	E.	28.5	5.1	1.71
		..	..	2.99
Edgar Hunt's Darling II. of Springdale	E.	15.5	5.1	0.93
	M.	16.5	3.5	0.67
		..	..	1.60

HOME MILKING—*continued.*

		Milk Lb.	Test.	Com- mercial Butter.
<i>Friesians.</i>				
S. H. Hosking's Margaret Anglin II.	E.	20.5	3.9	0.93
	*M.	21.5	4.2	1.05
	†M.	22.0	3.5	0.90
	N.	22.5	4.0	1.04
	..	..	..	3.92
P. P. Falt's Oaklea Noreen	E.	33.5	3.8	1.48
	M.	36	5.4	2.29
	..	..	..	3.77
P. P. Falt's Dairymaid.. .. .	E.	24	4.4	1.24
	M.	26	4.2	1.28
	N.	21.5	4.8	1.205
	..	..	..	3.725

Grindles Ltd. Lady Creamille	M.	34	3.8	1.51
	E.	31	4.2	1.53
	..	..	..	3.04
<i>Ayrshires.</i>				
Executors late John Anderson's Jeanette R. III. of Invercauld	M.	28.5	4.0	1.32
	E.	29	4.0	1.35
	M.	31	3.9	1.41
	E.	26	4.2	1.28
	..	..	..	5.36

Jonas Holmes' Peggy II. of Longlands	M.	27.5	3.5	1.120
	E.	28	4.4	1.440
	M.	25	3.6	1.070
	E.	28.5	4.6	1.530
	..	..	..	5.16

Penal Establishment's (St. Helena) Jeannie III. ..	M.	30	3.1	1.08
	E.	26	3.8	1.16
	M.	30	4.0	1.40
	E.	28	4.1	1.35
	..	..	..	4.99

* Midnight.

† Morning.

MILKING TESTS.

Judges:—Messrs. R. W. Winks and L. F. Anderson. Mr. E. D. Lewley's Lorna of Arley won the National champion butter-fat test. Owing to an error the awards in two classes were not made available. Details:—

Cow, 4 YEARS OLD AND OVER, AVERAGING THE GREATEST DAILY YIELD OF BUTTER FAT FOR 48 HOURS.

		Milk, Lb.	Percentage.	Commercial Butter.	Points Butter Fat 24 hours.	Lactation Points.	Total Points.
E. D. Lawley's Lorna of Arley	M.	34.8	3.8	1.530	..	..	..
	E.	30.14	5.0	1.814	..	..	..
	M.	35.10	3.8	1.575	..	..	..
	E.	31.9	4.5	1.668	..	..	..
		132.9	..	6.587	52.7	..	52.7
A. Pickel's Jean the Fifth of Blacklands	M.	27.7	4.4	1.412	..	..	..
	E.	24.6	5.6	1.603	..	..	..
	M.	26.4	4.4	1.353	..	..	..
	E.	22.14	4.6	1.234	..	..	..
		100.15	..	5.602	44.8	..	44.8
B. O'Connor's Tulip the Fourth of Hillview	M.	28.12	3.7	1.240	..	..	..
	E.	25.6	4.5	1.339	..	..	..
	M.	27.8	4.2	1.350	..	..	..
	E.	25.10	4.5	1.351	..	..	..
		107.4	..	5.280	42.2	..	42.2
B. O'Connor's Dahlia 2nd of Hillview	M.	35.8	2.9	1.185	..	..	..
	E.	32.5	3.6	1.363	..	..	..
	M.	32.12	3.5	1.330	..	..	..
	E.	33.1	3.2	1.232	..	..	..
		133.10	..	5.110	40.9	..	40.9
R. Mear's Hazel of Morden	M.	22.12	3.9	1.030	..	..	..
	E.	19.14	4.1	0.945	..	..	..
	M.	21.5	3.2	0.789	..	..	..
	E.	20.14	4.1	0.995	..	..	..
		84.13	..	3.732	29.9	10	39.9
J. F. Cochrane's Trixie of Newholme	M.	29.4	3.3	1.128	..	..	..
	E.	27.8	4.0	1.280	..	..	..
	M.	30.0	3.5	1.220	..	..	..
	E.	28.10	4.0	1.325	..	..	..
		115.6	..	4.953	39.6	..	39.6
R. Mear's Tulip of Morden	M.	27.1	2.5	0.786	..	..	..
	E.	26.6	4.4	1.359	..	..	..
	M.	26.4	3.0	0.907	..	..	..
	E.	29.0	4.4	1.490	..	..	..
		108.11	..	4.542	36.3	..	36.3

MILKING TESTS—*continued.*

COW, 4 YEARS OLD AND OVER, AVERAGING THE GREATEST DAILY YIELD OF BUTTER FAT FOR 48 HOURS—*continued.*

—	—	Milk, Lb.	Percentage.	Commercial Butter.	Points Butter Fat 24 hours.	Lactation Points.	Total Points.
A. J. Caswell's Floss of Dalwon	M.	29.8	2.8	0.955	..	..	..
	E.	26.13	3.2	0.995	..	..	..
	M.	29.12	3.3	1.143	..	..	..
	E.	27.14	3.7	1.305	..	..	..
		113.15	..	4.298	34.4	..	34.4
E. Burton's Oxford Golden Buttercup	M.	19.14	4.4	1.024	..	..	..
	E.	18.5	5.3	1.139	..	..	..
	M.	19.11	4.5	1.044	..	..	..
	E.	18.6	5.0	1.079	..	..	..
		76.4	..	4.286	34.3	..	34.3
W. F. Hammel's Ginger	M.	23.14	3.7	1.025	..	..	..
	E.	20.9	3.8	0.913	..	..	..
	M.	20.10	3.4	0.809	..	..	..
	E.	18.8	4.6	0.995	..	..	..
		83.9	..	3.742	29.9	..	29.9
J. William's Lizzie of Woodbine	M.	21.2	3.0	0.734	..	..	..
	E.	19.4	3.6	0.880	..	..	..
	M.	20.10	2.6	0.623	..	..	..
	E.	22.1	4.3	1.103	..	..	..
		83.1	..	3.260	26.1	2.2	28.3

COW, 4 YEARS OLD AND OVER, AVERAGING THE GREATEST YIELD OF BUTTER FAT FOR 48 HOURS.

—	—	Milk, Lb.	Percentage.	Commercial Butter.
E. D. Lawley's Lorna of Arley	M.	34.8	3.8	1.530
	E.	30.14	5.0	1.814
	M.	35.10	3.8	1.575
	E.	31.9	4.5	1.668
		132.9	..	6.587
A. Pickel's Jean the Fifth of Blacklands	M.	27.7	4.4	1.412
	E.	24.6	5.6	1.603
	M.	26.4	4.4	1.353
	E.	22.14	4.6	1.234
		100.15	..	5.602
B. O'Connor's Tulip the Fourth of Hillview.. ..	M.	28.12	3.7	1.240
	E.	25.6	4.5	1.339
	M.	27.8	4.2	1.350
	E.	25.10	4.5	1.351
		107.4	..	5.280

MILKING TESTS—*continued.*COW, 4 YEARS AND OVER, AVERAGING THE GREATEST YIELD OF BUTTER FAT FOR
48 HOURS—*continued.*

					Milk, Lb.	Per- centage.	Com- mercial Butter.
B. O'Connor's Dahlia 2nd of Hillview				M.	35.8	2.9	1.185
				E.	32.5	3.6	1.363
				M.	32.12	3.5	1.330
				E.	33.1	3.2	1.232
					133.10	..	5.110
J. F. Cochrane's Trixie of Newholme				M.	29.4	3.3	1.128
				E.	27.8	4.0	1.280
				M.	30.0	3.5	1.220
				E.	28.10	4.0	1.325
					115.6	..	4.953
R. Mears' Tulip of Morden				M.	27.1	2.5	0.786
				E.	26.6	4.4	1.359
				M.	26.4	3.0	0.907
				E.	29.0	4.4	1.490
					108.11	..	4.542
A. J. Caswell's Floss of Dnalwon				M.	29.8	2.8	0.955
				E.	26.13	3.2	0.995
				M.	29.12	3.3	1.143
				E.	27.14	3.7	1.205
					113.15	..	4.298
W. F. Hammel's Ginger				M.	23.14	3.7	1.025
				E.	20.9	3.8	0.913
				M.	20.10	3.4	0.809
				E.	18.8	4.6	0.995
					83.9	..	3.742
E. Burton's Oxford Golden Girl				M.	21.12	3.4	0.859
				E.	20.4	3.8	0.900
				M.	19.10	3.8	0.875
				E.	19.2	4.3	0.956
					80.12	..	3.590
J. William's Lizzie Woodbine				M.	21.2	3.4	0.734
				E.	19.4	3.6	0.800
				M.	20.10	2.6	0.623
				E.	22.1	4.3	1.103
					83.1	..	3.260

MILKING TESTS—*continued.*

COW YIELDING THE LARGEST SUPPLY OF MILK IN 48 HOURS.

								Milk, Lb.	Percentage.
B. O'Connor's Dahlia 2nd of Hillview	M.	35.8	2.9	E.	32.5	3.6	M.	32.12	3.5
	E.	33.1	3.2				E.	33.1	3.2
Total		133.10	..						
E. D. Lawley's Lorna of Arley	M.	34.8	3.8	E.	30.14	5.0	M.	35.10	3.8
	E.	31.9	4.5				E.	31.9	4.5
Total		132.9	..						
J. F. Cochrane's Trixie of Newholme	M.	29.4	3.3	E.	27.8	4.0	M.	30.0	3.5
	E.	28.10	4.0				E.	28.10	4.0
Total		115.6	..						
R. Mear's Tulip of Morden	M.	27.1	2.5	E.	26.6	4.4	M.	26.4	3.0
	E.	29.0	4.4				E.	29.0	4.4
Total		108.11	..						
B. O'Connor's Tulip the Fourth of Hillview	M.	28.12	3.7	E.	25.6	4.5	M.	27.8	4.2
	E.	25.10	4.5				E.	25.10	4.5
Total		107.4	..						
A. Pickel's Jean the Fifth of Blacklands	M.	27.4	4.4	E.	24.6	5.6	M.	26.4	4.4
	E.	22.14	4.6				E.	22.14	4.6
Total		100.15	..						
W. F. Hammel's Ginger	M.	23.14	3.7	E.	20.9	3.8	M.	20.10	3.4
	E.	18.8	4.6				E.	18.8	4.6
Total		83.9	..						

MILKING TESTS—*continued*.

SPECIAL PRIZE, 4 YEARS OLD AND OVER, AVERAGING THE GREATEST DAILY YIELD OF BUTTER FAT FOR 48 HOURS.

		Milk, Lb.	Per- centage.	Com- mercial Butter.
E. D. Lawley's Lorna of Arley	M.	34·8	3·8	1·53
	E.	30·14	5·0	1·814
	M.	35·10	3·4	1·575
	E.	31·9	4·5	1·668
		132·9	..	6·587
A. Pickel's Jean the Fifth of Blacklands	M.	27·7	4·4	1·412
	E.	24·6	5·6	1·603
	M.	26·4	4·1	1·353
	E.	22·14	4·6	1·234
		100·15	..	5·602
B. O'Connor's Tulip Fourth of Hillview	M.	18·12	3·7	1·240
	E.	25·6	4·5	1·339
	M.	27·8	4·2	1·350
	E.	25·10	4·5	1·351
		107·4	..	5·280

ROYAL NATIONAL CHAMPION BUTTER-FAT TEST.

Cow, any breeding, averaging the greatest yield of butter-fat for forty-eight hours under the Babcock test, and which has been the property of the exhibitor three months before the entry.

£25 special prize, and a cash prize of £2 2s. yearly to the winner, presented by Brisbane Newspaper Company.

		Milk, Lb.	Per- centage.	Com- mercial Butter.	Point's for Butter 24 HOURS.	Lactation Points.	Total Points.
E. D. Lawley's Lorna of Alrey	M.	34·8	3·8	1·530	..	..	..
	E.	30·14	5·0	1·814	..	..	..
	M.	35·10	3·8	1·575	..	..	..
	E.	31·9	4·5	1·668	..	..	..
Total		132·19	..	6·587	52·7	..	52·7

NOTE.—The above was the only one given in the official book.

MILKING TESTS—*continued*

The following additional milking test awards were made available on 9th August:—

COW OR HEIFER, UNDER 4 YEARS, AVERAGING THE GREATEST DAILY YIELD OF BUTTER FAT FOR 48 HOURS.

				Weight of Milk.	Per- centage.	Com- mercial Butter.
A. J. Caswell's Rosie IV. of Greyleigh	..	..	M.	28.8	3.5	1.160
			E.	22.8	4.2	1.100
			M.	22.10	4.5	1.201
			E.	21.2	4.3	1.056
				94.12	..	4.517
E. Burton's Oxford Golden Buttercup	..	..	M.	19.14	4.4	1.024
			E.	18.5	5.3	1.139
			M.	19.11	4.5	1.044
			E.	18.6	5.0	1.079
				76.4	..	4.286
W. Spresser's Carnation Lucy	..	..	M.	19.4	3.6	0.800
			E.	18.8	5.3	1.150
			M.	19.0	5.0	1.120
			E.	18.12	5.2	1.145
				75.8	..	4.215
P. Moore's Clover V. of Sunnyside	..	..	M.	25.8	3.8	1.130
			E.	22.8	3.8	1.000
			M.	24.0	3.2	0.890
			E.	22.13	4.1	1.093
				94.13	..	4.113
C. Behrendorff's Fanny of Inavale	..	..	M.	22.14	3.2	1.015
			E.	22.3	3.7	0.958
			M.	24.10	3.5	1.005
			E.	22.0	4.0	1.020
				91.11	..	3.998
Macfarlane Bros.' Viola XXVI. of Darbalara	..		M.	23.2	2.9	0.774
			E.	22.2	3.8	0.985
			M.	22.9	3.5	0.924
			E.	21.8	3.6	0.900
				89.5	..	3.583
R. E. Freeman's Veresdale Ruby	..	..	M.	19.1	4.0	0.883
			E.	18.14	4.7	1.034
			M.	18.10	2.7	0.579
			E.	20.1	4.1	0.962

MILKING TESTS—*continued.*COW OR HEIFER, UNDER 4 YEARS, AVERAGING THE GREATEST DAILY YIELD OF BUTTER FAT FOR 48 HOURS—*continued.*

—	—	Weight of Milk.	Per- centage.	Com- mercial Butter.
A. Pickel's Pearl II. of Blacklands	M.	19.7	3.3	0.743
	E.	18.2	4.6	0.976
	M.	21.8	3.4	0.845
	E.	18.1	3.9	0.823
		77.2	..	3.387
Macfarlane Bros.' Handsome II. of Kilbirnie ..	M.	22.14	2.7	0.707
	E.	22.12	3.2	0.833
	M.	23.4	3.2	0.857
	E.	23.0	3.2	0.850
		91.14	..	3.247
F. G. Brown's Maud Rooker Korndyke	M.	23.2	2.0	0.538
	E.	24.0	3.0	0.849
	M.	22.3	3.2	0.816
	E.	17.8	4.0	0.810
		87.7	..	3.013
G. Isles' Lily II. of Eldo	M.	16.15	3.1	0.600
	E.	14.13	3.8	0.653
	M.	15.6	3.8	0.685
	E.	14.2	3.8	0.625
		61.4	..	2.563

COW OR HEIFER, UNDER 4 YEARS, AVERAGING THE GREATEST DAILY YIELD OF BUTTER FAT FOR 48 HOURS.

—	—	Weight of Milk.	Per centage.	Com- mercial Butter.	Points Butter Fat, 24 hours.	Lactation Points.	Total Points.
A. J. Caswell's Rose the Fourth of Greyleigh	M.	28.8	3.5	1.160	..	..	..
	E.	22.8	4.2	1.100	..	..	..
	M.	22.0	4.5	1.201	..	..	..
	E.	21.2	4.3	1.056	..	..	..
		94.12	..	4.517	36.1	..	36.1
E. Burton's Oxford Golden Buttercup	M.	19.14	4.4	1.024	..	..	..
	E.	18.5	5.3	1.139	..	..	..
	M.	19.11	4.5	1.044	..	..	..
	E.	18.6	5.0	1.079	..	..	..
		76.4	..	4.286	34.3	..	34.3
W. Spresser's Carnation Lucy	M.	19.4	3.6	0.800	..	..	..
	E.	18.8	5.3	1.150	..	..	..
	M.	19.0	5.0	1.120	..	..	..
	E.	18.12	5.2	1.145	..	..	..
		75.8	..	4.215	33.7	..	33.7

MILKING TESTS—*continued.*COW OR HEIFER, UNDER 4 YEARS, AVERAGING THE GREATEST DAILY YIELD OF BUTTER FAT FOR 48 HOURS—*continued.*

		Weight of Milk.	Per- centage.	Com- mercial Butter.	Points Butter Fat 24 hours.	Lactation Points.	Total Points.
P. Moore's Clover the Fifth of Sunnyside	M.	25·8	3·8	1·130	..	..	..
	E.	22·8	3·8	1·000	..	..	..
	M.	24·0	3·2	0·890	..	..	..
	E.	22·13	4·1	1·093	..	..	..
		94·13	..	4·113	32·9	..	32·9
C. Behrendorff's Fanny of Inavale	M.	22·14	3·8	1·015	..	..	..
	E.	22·3	3·7	0·958	..	..	..
	M.	24·10	3·5	1·005	..	..	..
	E.	22·0	4·0	1·020	..	..	..
		91·11	..	3·998	32·0	..	32·0
Macfarlane Bros.' Viola the Twenty-sixth of Darbalara	M.	23·2	2·9	0·774	..	..	..
	E.	22·2	3·8	0·985	..	..	..
	M.	22·9	3·5	0·924	..	..	..
	E.	21·8	3·6	0·900	..	..	..
		89·5	..	3·583	28·7	..	28·7
M. Lawrence's Model the Second of City View	M.	16·12	3·4	0·659	..	..	..
	E.	14·6	3·5	0·585	..	..	..
	M.	16·8	3·5	0·670	..	..	..
	E.	14·8	3·9	0·660	..	..	..
		62·2	..	2·574	20·6	7·5	28·1
R. E. Freeman's Veres- dale Ruby	M.	19·1	4·0	0·883	..	..	..
	E.	18·14	4·7	1·034	..	..	..
	M.	18·10	2·7	0·579	..	..	..
	E.	20·1	4·1	0·962	..	..	..
		76·10	..	3·458	27·7	..	27·7
A. Pickel's Pearl Third of Blacklands	M.	19·7	3·3	0·743	..	..	..
	E.	18·2	4·6	0·976	..	..	..
	M.	21·8	3·4	0·845	..	..	..
	E.	18·1	3·9	0·823	..	..	..
		77·2	..	3·387	27·1	..	27·1
Macfarlane Bros.' Hand- some the Second of Kilbirnie	M.	22·14	2·7	0·707	..	..	..
	E.	22·12	3·2	0·833	..	..	..
	M.	23·4	3·2	0·857	..	..	..
	E.	23·0	3·2	0·850	..	..	..
		91·14	..	3·247	26·0	..	26·0
G. Isles' Lily the Second of Eldo	M.	16·15	3·1	0·600	..	..	..
	E.	14·13	3·8	0·653	..	..	..
	M.	15·6	3·8	0·685	..	..	..
	E.	14·2	3·8	0·625	..	..	..
		61·4	..	2·563	20·5	..	20·5

BACON, HAMS, AND LARD.

The following are the awards for bacon, hams, and lard:—

	Flavour.	Texture.	Proportion of Fat and Lean.	Butchering.	Smoking.	Colour.	Total.
--	----------	----------	-----------------------------	-------------	----------	---------	--------

BACON, SIX SIDES, FACTORY CURED.

Possible points.. ..	45	10	10	10	10	15	100
J. C. Hutton Propty., Ltd., Brisbane	42	8	9	8	8½	13	88½
Queensland Co-operative Bacon Co., Ltd.	43	8	8½	8	8	12½	88
J. C. Hutton Propty., Ltd., Brisbane	41½	7	8	7½	8½	12	84½
Queensland Co-operative Bacon Co., Ltd.	41	8½	7½	8½	8	11	84½
J. C. Hutton Propty., Ltd., Canterbury, N.S.W.	40½	6	7	7	7½	10½	78½

HAMS, SIX, FACTORY CURED.

J. C. Hutton Propty., Ltd., Canterbury, N.S.W.	42	9	9	8	8	13	89
J. C. Hutton Propty., Ltd., Brisbane	42½	9	8	8	8½	12½	88½
Queensland Co-operative Bacon Co., Ltd.	41½	8½	8	8½	9	12½	88
Queensland Co-operative Bacon Co., Ltd.	42	8½	7½	8½	9	9	87½
J. C. Hutton Propty., Ltd., Brisbane	42½	7½	7½	8	8	12	85½

LARD IN BLADDERS.

	Flavour.	Texture.	Colour.	Finish and Appearance.	Total.
Possible points	40	25	25	10	100
J. C. Hutton Propty., Ltd., Brisbane	35	23	24	9	91
J. C. Hutton Propty., Ltd., Brisbane	34	23	24	9	90
Queensland Co-operative Bacon Co., Ltd. ..	32	21	22	8½	83½
Queensland Co-operative Bacon Co., Ltd. ..	32	21	22	8	83

SAUSAGES, SMOKED, 14 LB.

Queensland Co-operative Bacon Co., Ltd., 1.
J. C. Hutton Propty., Ltd., Brisbane, 2.

YOUNG JUDGES' COMPETITION.

There was keen rivalry in the young judges' competition, which is open to students of agricultural colleges, young farmers, farmers' sons, and others twenty-five years of age and under. Competition took place in four classes—Clydesdale stallions, beef cattle, dairy cattle (Illawarra Milking Shorthorns and Jerseys), and swine. Details:—

Dairy Cattle.—Illawarra Milking Shorthorns: H. Gordon, Lawnton, 1; A. J. Brown, Moorcombin, Toogoolawah, 2; J. H. Bassett, Mullumbimby, 3. Jerseys: O. W. Spreser, Brassall P.O., Ipswich, 1; R. M. Anderson, Fairview, Southbrook, 2; W. Carr, junr., Indooroopilly, 3.

Swine.—Berkshires: J. H. Bassett, Mullumbimby, 1; H. F. Whittaker, Victoria Park, Southbrook, 2; H. Gordon, Lawnton, and J. B. Warburton, Northgate Junction, 3.

HORSES.

THOROUGHBREDS.

Judge, Mr. H. J. Gidney.

Stallions, 4 years and over, best adapted for improved racing stock: T. Jennings's Amberdown, 1; E. Bagley's Soldier's March, 2; State Stations Department's Paddington, 3. Four years and over, most suitable for getting horses for military purposes: W. H. Mayes's Hopoast, 1; E. Bagley's Soldier's March, 2.

Mares, 4 years and over: J. E. Shailer's Bonnie Syce, 1; J. T. Jackson's Miss Warroo, 2. Remount mares, best suited for producing remounts, hacks, hunters, &c.: Mrs. D. Fraser's Elsinora, 1; R. J. Andrews's Myrtle Pride, 2.

Champion stallion: T. Jennings's Amberdown. Reserve champion: E. Bagley's Soldier's March. The yellow ribbon went to Paddington (imp.), bred in England in 1903, and got by Martagon from Padua. Paddington was exhibited by the State Stations Department.

STUD TROTTERS AND PACERS.

Judge, Mr. W. J. Armstrong.

Stud book stallions, 6 years and over: J. Rice's Rex Wilkes, 1; M. W. Doyle's Sparkling Bells, 2. Stallion, 5 years and over: A. G. Hunter's Globe Derby, 1; R. Cocks's King Bells, 2. Colt, 2 years: J. Rice's Billie Wilkes, 1. Mare, 5 years and over: S. C. Reeves's Black Ribbons, 1; J. Rice's Ella Wilkes, 2. Mare, 4 years: J. Rice's Biddy Wilkes. Filly, 3 years: D. Knox's Winn Ella, 1; S. E. Green's Roma's Pride, 2. Family group, sire and two of his progeny: J. Rice's Rex Wilkes and progeny, 1.

Champion trotting stallion: A. G. Hunter's Globe Derby.

Reserve champion: J. Rice's Rex Wilkes.

Champion trotting mare: S. C. Reeves's Black Ribbons.

Reserve champion: J. Rice's Biddy Wilkes.

HEAVY DRAUGHT HORSES.

Judge, Mr. R. Tait.

CLYDESDALES.

Stallion, 5 years and over: J. Kilvington's Pride O'Glenore, 1; C. J. Ryman's Donald's Perfection, 2. Stallion, 4 years: J. W. McAllister's Prince Invermay, 1. Stallion, 3 years: Queensland Agricultural College's Prospector, 1; G. Elliott's Baron Windermere, 2. Colt, 1 year: J. H. Kilvington's Robin, 1. Mare, 5 years and over: G. Elliott's Lady Cellus, 1; R. Jackson, Ltd., Girlie, 2. Mare, 4 years: A. T. Creswick's Nellie, 1; A. T. Creswick's Lady Jane, 2; J. Hamilton's Heather Belle, 3. Brood mare: J. H. Kilvington's Myrtle, 1; J. H. Kilvington's Maidenhair, 2. Filly, 3 years: A. T. Creswick's Lady Windermere, 1. Filly, 2 years: G. Elliott's Lady Rangatira, 1; J. H. Kilvington's Madge, 2. Filly, 1 year: J. H. Kilvington's Star, 1. Family group, sire and two of his progeny: J. H. Kilvington's Pride O'Glenore (sire), Madge and Star.

SHIRES.

Judge, Mr. R. Tait.

Stallion, 3 years and over: J. Ernart's Hermitage, 1.

Champion draught stallion: J. H. Kilvington's Pride O'Glenore.

Reserve champion: Queensland Agricultural College's Prospector.

Champion draught mare: A. T. Creswick's Nellie.

Reserve champion: A. T. Creswick's Lady Jane.

MULES.

Light mule, any age: R. Jackson, Ltd., Digger's Donk, 1.

COBS.

Judge, Mr. L. P. Dutton.

Stallion, any age, not exceeding 15 hands: W. Wildermuth's Wildermere Meteor,

1. Mare, any age, not exceeding 15 hands: Miss E. O. Drury's Banshee, 1.

Champion cob stallion: W. Wildermuth's Wildermere Meteor.

Champion cob mare: Miss E. O. Drury's Banshee.

STUD PONIES.

Judge, Mr. L. P. Dutton.

Pony stallions best adapted for getting harness ponies. Stallion, any age, not exceeding 14 hands, to be driven in harness: H. A. Strong's Excel II., 1; T. Simpson's The Welshman, 2. Stallion, any age, to be led, not exceeding 14 hands: A. T. Noyes's Young Gaffer, 1. Stallion, any age, not exceeding 13 hands: H. A. Strong's Excel II., 1; G. E. Jackson's Little Harold, 2. Stallion any age, not exceeding 12 hands: C. J. Hobbs's Don, 1; E. J. Harris's Comet, 2.

Champion pony stallion, best adapted for getting harness ponies: C. J. Hobbs's Don.

Reserve champion: H. A. Strong's Excel II.

Pony stallions best adapted for getting saddle ponies. Stallion, any age, not exceeding 14 hands: E. Pocock's Ludo, 1; S. A. Whiting's Merry King, 2. Stallion, any age, not exceeding 13 hands: E. Pocock's Ludo, 1; S. A. Whiting's Merry King, 2. Stallion, any age, not exceeding 12 hands: Mrs. E. T. Thomson's Bonny Boy, 1.

Champion pony stallion best adapted for getting saddle ponies: E. Pocock's Ludo.

Reserve champion: S. A. Whiting's Merry King.

Welsh ponies, stallion, any age, not exceeding 14 hands: T. Simpson's The Welshman, 1; A. T. Noyes's Young Gaffer, 2.

Pony mares, brood mare, any age, not exceeding 14 hands: L. Dobson's Llew Lass, 1; C. J. Biddle's Wilston Belle, 2; highly commended, W. Farley's Dinah. Brood mare, any age, not exceeding 13 hands: R. C. Fagg's Girlie, 1; J. Mullen's Gold Top, 2; highly commended, A. E. Johnston's Peace. Brood mare, any age, not exceeding 12 hands: A. T. Noyes's Banglet, 1; Mrs. D. J. Stewart's Midge, 2; highly commended, E. B. Hughes's Bessie.

Champion pony mare: R. C. Fagg's Girlie. Reserve champion: A. T. Noyes's Banglet.

CATTLE.

HEREFORDS.

Judge, Mr. J. A. Beattie.

Hereford bull, 4 years and over: J. Sparkes's Mansel Liberator, 1; J. T. Turner's Holmwood Baron, 2. 3 and under 4 years: J. Sparkes's Mansel Banner Prince, 1; E. C. McConnel's Red Rupert, 2; J. T. Turner's Lord Chancellor, 3. 2 and under 3 years: J. Sparkes's Lyndley Monarch 1st, 1; J. H. S. Barnes's Broadwood Chance, 2; E. C. McConnel's Cressbrook Merry Boy, 3. 18 months and under 2 years: C. H. Tindal's Ramornie Commodore, 1; J. Sparkes's Admiration, 2; J. H. S. Barnes's King Broadwood, 3; E. C. McConnel's Cressbrook Premier, very highly commended;

J. Sparkes's Lyndley Baronet, highly commended. 12 months and under 18 months: J. Sparkes's Lyndley Royal, 1; J. Sparkes's Lord Lyndley 5th, 2; Tindal and Sons' Gunyan Magnitude 10th, 3. Bull calf, 6 and under 12 months: J. Sparkes's Lyndley Chief, 1; E. R. Reynolds's Sunrise, 2; F. Maxwell's Banner Prince, 3; F. Maxwell's Major Lad, very highly commended. Pair of bulls, 1 and under 2 years: J. Sparkes, 1. Group of three bulls: J. Sparkes, 1; J. H. S. Barnes, 2.

Champion Hereford bull: J. Sparkes's Mansel Liberator. Reserve champion bull: J. Sparkes's Mansel Banner Prince.

Cow, 4 years and over: J. Sparkes's Jessie Lyndley, 1; J. H. S. Barnes's Queen Flower 3rd, 2. 3 and under 4 years: J. H. S. Barnes's Miss Beattie 2nd, 1; J. Sparkes's Allie Lyndley, 2. Cow, with calf at foot: J. H. S. Barnes's Queen Flower 3rd, 1; J. Sparkes's Jessie Lyndley, 2. Cow, with two or more of her progeny: J. H. S. Barnes's Queen Flower III., 1. Cow or heifer, 2 and under 3 years: J. Sparkes's Jessie Lyndley 15th, 1; E. C. McConnel's Cressbrook Bernice, 2; E. C. McConnel's Lady President 8th, 3. Heifer, 18 months and under 2 years, J. Sparkes's Lady Lyndley 33rd, 1; J. Sparkes's Lyndley Minerva 18th, 2; E. C. McConnel's Lady President 13th, 3. Heifer 12 and under 18 months: J. H. S. Barnes's Canning Chance, 1; J. Sparkes's Lyndley Minerva 19th, 2. Heifer calf, 6 and under 12 months: J. H. S. Barnes's Flower Queen, 1; J. Sparkes's Lyndley Baroness, 2; E. C. McConnel's Cressbrook Pallia 10th, 3. Pair of heifers, 1 and under 2 years: J. Sparkes, 1. Group of three heifers: J. Sparkes, 1.

Champion Hereford cow: J. H. S. Barnes's Miss Beattie 2nd. Reserve champion cow: J. Sparkes's Jessie Lyndley.

Group.—Sire and three of his progeny: J. H. S. Barnes, 1. Breeder's group (2 males and 3 females): J. H. S. Barnes, 1; J. Sparkes, 2. Exhibitor's group (2 males and 3 females), open: J. Sparkes, 1; J. H. S. Barnes, 2. Sires' progeny stakes group, 3 animals, one sire's progeny: J. H. S. Barnes, 1; J. Sparkes, 2.

SHORTHORNS.

Judge, Donald Munro, Esq.

Bull, 4 years and over: J. Burgess's Adcote Butterfly Beau, 1; A. E. Slade's Warspite, 2. Bull, 3 years and under 4 years: Lord Bros.' Clifton Cherry Colonel, 1. Bull, 2 years and under 3 years: A. R. Lomax's Yandilla Grand Duke 47th, 1; C. E. McDougall's Lyndhurst Royal Peer 27th, 2. Bull, 18 months and under 2 years: J. S. Thonemann's Kuyara Duke of Derrimut 7th, 1; R. R. Dangar's Mooki Wild Eves Duke 2nd, 2. Bull, 12 months and under 18 months: C. E. McDougall's Lyndhurst Royal Peer 35th, 1; J. Burgess's Fairy King, 2. Bull calf, 6 months and under 12 months: J. Burgess's Fairy Knight 4th, 1; John Macgregor's Dalmore Favourite, 2; C. E. McDougall's Lyndhurst Wexham Heir I., 3; highly commended, John Macgregor's Dalmore Lord Matchem, J. S. Thonemann's Kuyara Prince 3rd, and J. S. Thonemann's Kuyara Duke of Derrimut 10th. Group of three bulls, 12 months and under 3 years: C. E. McDougall's exhibit.

Champion Shorthorn bull of Queensland: J. S. Thonemann's Kuyara Duke of Derrimut 7th. Reserve champion: J. Burgess's Adcote Butterfly Beau.

Shorthorn cow, 4 years and over: Lord Bros.' Yandilla Grand Duchess 8th, 1; J. Burgess's Princess Royal, 2; C. E. McDougall's Lyndhurst Princess Imperial 2nd, 3. Cow, 3 years and over 4 years: C. E. McDougall's Lyndhurst Royal Rose, 1. Cow, with calf at foot: J. Burgess's Princess Royal and progeny, 1; C. E. McDougall's Lyndhurst Princess Imperial 2nd and progeny, 2. Cow and two or more of her progeny: J. Burgess's Princess Royal and progeny, 1; C. E. McDougall's Lyndhurst Princess Imperial 2nd and progeny, 2. Cow or heifer, 2 years and under 3 years: C. E. McDougall's Lyndhurst Duchess of Ettrick, 1; C. E. McDougall's Lyndhurst Duke of York 2nd, 2. Heifer, 18 months and under 2 years: J. S. Thonemann's Kuyara Duchess of Derrimut 10th, 1; A. J. Cotton's Brooklyn Pansy, 2. Heifer, 12 months and under 18 months: C. E. McDougall's Lyndhurst Royal Rose 2nd, 1; Lord Bros.' Victoria Downs Duchess of Morven, 2. Heifer calf, 6 months and under 12 months: J. S. Thonemann's Kuyara Princess 2nd, 1; C. E. McDougall's Lyndhurst Lily of Gurley 2nd, 2. Group of three heifers, 12 months and under 3 years: C. E. McDougall's exhibit, 1.

Champion Shorthorn cow of Queensland: C. E. McDougall's Lyndhurst Royal Rose. Reserve champion: J. S. Thonemann's Kuyara Duchess of Derrimut 10th.

Breeder's group, 2 males and 3 females, 12 months and over: C. E. McDougall's exhibit. Exhibitor's group, 2 males and 3 females, 12 months and over, open: C. E. McDougall's exhibit, 1; J. Burgess's exhibit, 2. Sires' progeny stakes group: John Macgregor's exhibit, 1; C. E. McDougall's exhibit, 2.

STUD BEEF HERDS.**DEVONS.**

Judge, Mr. T. McIlwraith Taylor.

Bull, 3 years and over: R. A. Howell's Field Marshal 16th, 1. 2 and under 3 years: R. A. Howell's Forester's Gold Dust, 1; R. A. Howell's Field Marshal 39th, 2; R. A. Howell's Field Marshal 40th, 3. Bull, 1 and under 2 years: R. A. Howell's Field Marshal 47th, 1. Heifer, 2 and under 3 years: R. A. Howell's Lusty, 1. Cow, 3 years and over: R. A. Howell's Lusty 17th, 1.

Champion bull: R. A. Howell's Forester's Gold Dust. Reserve champion bull: R. A. Howell's Field Marshal 16th. Champion cow: R. A. Howell's Lusty 17th. Reserve champion cow: R. A. Howell's Lusty 37th.

SOUTH DEVONS.

Cow or heifer: C. Brumpton's Gentle Honesty, 1.

SUSSEX.

Bull, under 3 years: J. T. Turnor's Holmwood Ironduke, 1. Bull calf, 6 and under 12 months: J. T. Turnor's Earl Rufus, 1. Cow, 3 years and over: J. T. Turnor's Oakover Twin 5th, 1. Heifer calf, 6 and under 12 months: J. T. Turnor's Holmwood Twin.

Champion Sussex cow: J. T. Turnor's Oakover Twin.

ABERDEEN-ANGUS.

Bull, 3 years and over: G. C. Clark's Tom Thumb, 1. 1 and under 2 years: G. C. Clark's Black Jupiter, 1; G. C. Clark's Scottish Peer, 2.

Champion Aberdeen-Angus bull: G. C. Clark's Tom Thumb. Reserve champion bull: G. C. Clark's Black Jupiter.

Cow, 3 years and over: G. C. Clark's Scotswoman.

Heifer, 1 and under 2 years: G. C. Clark's Fairy Princess. 6 and under 12 months: G. C. Clark's Raffia.

Champion Aberdeen-Angus cow: G. C. Clark's Scotswoman.

RED POLLED.

Bull, 3 years and over: E. J. McConnel's Royal Farmer, 1 and champion.

DAIRY CATTLE.**AYRSHIRES.**

Judge, Mr. R. Brisbane.

Cow, 5 years and over, in milk: J. Holmes's Bell of Longlands, 1; J. Holmes's Thelma of Longlands, 2; Executors, late J. Anderson, Jeanette R 3rd of Invercauld, 3. 4 and under 5 years, in milk: J. H. Fairfax's Gem of Marinya, 1; J. Holmes's Blanche of Longlands, 2; G. Bell's Thelma 3rd of Longlands, 3. 3 and under 4 years, in milk: J. Holmes's Blonde of Longlands, 1; J. Holmes's Rosella of Longlands, 2; P. Bell's Iona of Nudgee, 3. Heifer, 2 and under 3 years, in milk: J. Holmes's Tidy 2nd of Longlands, 1; J. H. Fairfax's Fantasy of Marinya, 2; J. C. Mann's Beryl's Pride of Crescent Farm, 3. 1 and under 2 years, in milk: J. C. Mann's Beryl's Gem of Crescent Farm. Cow, 4 years and over, in calf 6 months or dry: P. Bell's Beauty 3rd of St. Helena, 1; P. Bell's Agnes of Fairfield, 2; J. C. Mann's Viola of Glenmore, 3; J. Holmes's Rosalind 2nd of Longlands, 4. 3 and under 4 years: F. A. Stimpson's Dairymead of Fairfield, 1; Carr Bros.' College Annette, 2. Heifer, 2 and under 3 years, in calf or dry: F. A. Stimpson's Catherine of Fairfield, 1; H. T. Horne's Mayflower of Thorpe Garth, 2; F. A. Stimpson's Aggie Acme of Fairfield, 3. 1 and under 2 years, dry: F. A. Stimpson's St. Helena Melba, 1; J. Holmes's Pearl of Longlands, 2; R. J. and J. Harding's Rosaleen of Wetton, 3. Heifer calf, 6 and under 12 months: J. Holmes's Pearl 2nd of Longlands, 1; Executors, late J. Anderson, Juliette 2nd of Fairview, 2; J. C. Mann's Heather Bell of Crescent Farm, 3. Ayrshire Derby sweepstakes, for heifers calved between 1st July, 1919, and 30th June, 1920: F. A. Stimpson's Catherine of Fairfield, 1; F. A. Stimpson's Aggie Acme of Fairfield, 2; L. H. Paten's Cornflower 2nd of Jeyandel, 3.

Champion Ayrshire Cow: J. Holmes's Belle of Longlands. Reserve champion cow: P. Bell's Beauty 3rd of St. Helena.

Cow or heifer giving greatest yield of butter fat for twenty-four hours under Babcock test, milk to contain on an average not less than 3.3 per cent. of butter fat: Executors of late John Anderson's Jeanette R. 3rd of Invercauld, 1; H. M. Penal Establishment's St. Helena Jeannie 3rd, 2; Jonas Holmes's Peggy 3rd of Longlands, 3.

Bull, 4 years and over: P. Bell's Prince Roy of Longlands, 1; G. E. Brown's Jamie of Wanora, 2; F. A. Stimpson's St. Helena Premier, 3; P. Bell's Bobs of Fairfield, 4. 3 and under 4 years: J. H. Fairfax's Jellicoe of Marinya. 2 and under 3 years: J. Holmes's Prince of Fairview, 1; J. Holmes's Viceroy of Longlands, 2; Executors, late J. Anderson, Jackaroo of Fairview, 3. 1 and under 2 years: F. A. Stimpson's Duncan of Fairview, 1; J. C. Mann's Heather Boy of Crescent Farm, 2; J. Holmes's Gallant Hero of Longlands, 3. Bull calf: H.M. Penal Establishment, St. Helena, St. Helena Mischief Maker, 1; J. Holmes's Sir Tristham of Longlands, 2; Penal Establishment's St. Helena Principal, 3.

JERSEYS.

Judge, Mr. W. Carter.

Cow, 5 years and over, in milk: W. and D. Carr's Larkspur, 1; E. Burton's Oxford Girl, 2; J. Williams's Carlyle Lady Lynn, 3; J. Sinnamon's Ferns Barleycorn, 4. 4 and under 5 years, in milk: J. Sinnamon's Oxford Hazel, 1; E. Burton's Oxford Palatine's Gem, 2. 3 and under 4 years, in milk: E. Burton's Oxford Golden Buttercup, 1; J. Sinnamon's Oxford Barleycorn 2nd, 2; W. W. Mallet's The Endless Chain, 3. Heifer, 2 and under 3 years, in milk: Wm. Sprester's Carnation Lucy, 1; H. H. Domin's Oxford Golden Rosette, 2; J. F. Burnett's Golden Lass of Rosehill, 3. 1 and under 2 years, in milk: E. Burton's Oxford Noble Buttercup, 1; W. W. Mallet's Sultane's Pride of Burnleigh, 2; J. F. Burnett's Fanny of Rosehill, 3. Cow, 4 years and over, in calf, 6 months or dry: W. and D. Carr's Carlyle Lark, 1. E. Burton's Oxford Buttercup 4th, 2; T. Mullen's Lady Lass 3rd, 3; W. S. Conochie's Sultane 5th of Oaklands, 4. 3 and under 4 years, in calf or dry: H. H. Domin's Oxford Palatine Safety, 1; W. and D. Carr's Carlyle Larkspur, 2; J. Williams's Oxford Noble Dot 3rd, 3. Heifer, 2 and under 3 years, in calf or dry: J. Sinnamon's Trinity Sultane's Lass. Heifer, 1 and under 2 years, dry: E. Burton's Oxford Noble Bell, 1; W. and D. Carr's Carlyle Songstress 2nd, 2; J. Collins's Queen of Calton, 3. 6 and under 12 months: E. Burton's Oxford Primrose, 1; T. Mullen's Norwood Rosebud, 2; W. and D. Carr's Carlyle Flower, 3.

Children's Calf Class.—Heifer calf, 6 months and under 1 year: Miss Leila Carr's Carlyle Bessie Woodside, 1; Master R. Hays's Kenmore Queenie, 2; Miss E. M. Hays's Kenmore Fancy 2nd, 3. Cow or heifer, Australian bred: E. Burton, 1 and 3; J. Williams's Carlyle Lady Lynn, 2.

Champion Jersey cow: W. and D. Carr's Larkspur. Reserve champion: E. Burton's Oxford Girl.

Bull, 4 years and over: E. Burton's Oxford Golden Noble, 1; J. Sinnamon's Noble Palatine, 2; W. S. Conochie's Oxford Palatine Sultan, 3; F. G. Burton's Montrose Jack, 4.

Bull, 3 and under 4 years: W. and D. Carr's Empire of Woodside, 1; T. A. Petherick's Trinity Alfriston Duke, 2. 2 and under 3 years: W. W. Mallet's Trinity Baron, 1; E. Burton's Oxford Fairy Prince, 2; J. Sinnamon's Ginger Duke, 3.

Children's Calf Class.—Bull calf, 6 and under 12 months: T. Mullen's, junior, Norwood Model.

Cow or heifer giving greatest yield of butter fat for twenty-four hours under Babcock test, as above: E. Burton's Oxford Buttercup 4th, 1; T. Mullen's Lady Lass 3rd, 2; E. Burton's Oxford Golden Buttercup, 3.

Groups.—Sire and three of his progeny: E. Burton's Oxford Golden Noble and progeny, 1; W. and D. Carr's Empire of Woodside and progeny, 2; W. W. Mallet's Trinity Baron and progeny, 3. Two males and six females: E. Burton, 1; J. Sinnamon, 2; W. and D. Carr, 3. Sires' progeny stakes group, Australian bred: E. Burton, 1 and 3; J. Sinnamon, 2.

Bull, 1 and under 2 years: E. Burton's Werribee Clementine's King, 1; J. Sinnamon's Lord Ettrey of Danyule, 2; W. J. H. Austin's Premier of Rosehill, 3. Bull calf: J. Collins's Retford K.C., 1; J. Sinnamon's Trinity Officer, 2; T. Mullen's Oxford Palatine's Butter Boy, 3.

ILLAWARRA MILKING SHORTHORNS.

Cow, 5 years and over, in milk: S. Mitchell's Fuchsia of Strathdu, 1; A. Pickels's Jean 5th of Blacklands, 2; B. O'Connor's Dahlia 2nd of Hill View, 3; B. O'Connor's Tulip 4th of Hill View, 4. 4 and under 5 years, in milk: R. Mears's Hazel of Marden, 1; A. J. Caswell's Floss of Dualwen, 2; R. J. Morgan's Doreen of Burradale, 3. 3 and under 4 years, in milk: R. E. Freeman's Veresdale Ruby, 1; A. J. Caswell's Rosie 4th of Greyleigh, 2; R. J. Morgan's Dairymead 2nd of Burradale, 3. Heifer, 2 and under 3 years, in milk: A. Pickels's Daffodil of Blacklands, 1; A. C. Payne's Heather 2nd of Hillcrest, 2; Macfarlane Brothers Viola 26th of Darbalara, 3. Cow, 4 years or over, in calf 6 months or dry: W. Middleton's Mabel of Talgai, 1; B. O'Connor's Charm of Glenthorne, 2; A. Pickels's Envy 2nd of Blacklands, 3; R. J. Morgan's Gem of Rosebank, 4. Cow, 3 and under 4 years, in calf or dry: B. O'Connor's Rosebud 2nd of Greyleigh, 1; A. Pickels's Model of Blacklands, 2; B. O'Connor's Ena of Hill View, 3. Heifer, 2 and under 3 years, dry: W. Middleton's Gentle 3rd of Devon Court, 1; G. Brown's Bangle of Blacklands, 2; B. O'Connor's Skylark 2nd of Cosy Camp, 3. Heifer, 1 and under 2 years: C. A. Rossow's Beauty 2nd of Woodleigh, 1; R. Mear's Norah 3rd of Morden, 2; Macfarlane Brothers' Remembrance 9th of Kilbirnie, 3.

Children's Calf Class.—Heifer calf, 6 and under 12 months: Master W. J. Freeman's Crimson of Edenvale, 1; Master R. Freeman's Bud, 2; Master J. Hunt's Iris of Homeleigh, 3.

Champion Illawarra milking shorthorn cow: S. Mitchell's Fuchsia of Strathdu. Reserve champion: A. Pickels's Jean 5th of Blacklands.

Bull, 3 and under 4 years: G. E. J. Chaseling's Thor of Greyleigh, 1; Scot Brothers' Count of Burradale, 2; George Isle's Stella's Chief of Oakdale, 3; C. Key's Masterpiece of Oakdale and R. T. Ward's Charming Lord of Hillview, highly commended. 2 and under 3 years: B. O'Connor's Charm's Duholow of Oakvale, 1; A. C. Payne's Raleigh's Reflection of Glenthorne, 2; W. Caswell's Masterpiece of Greyleigh, 3. 1 and under 2 years: C. E. Franke's Warrior 1st of Hazeldean, 1; G. Rackemann's Spanker of Hanover, 2; A. Kent's Triumph of Oakvale, 2. Bull calf, 6 months and under 1 year, B. O'Connor's Brilliant of Oakvale, 1; A. Pickels's Prince Hugh of Blacklands, 2; Levingstone Brothers' Mystery Prince of Woodleigh, 3. Heifer calf, 6 and under 12 months: R. T. Ward's Fussy of Mount View, 1; B. O'Connor's Wakeful 4th of Oakvale, 2; F. O. Hayter's Fussy 4th of Spurfield.

Children's Calf Class.—Bull calf, 6 months and under 1 year: Master W. J. Freeman's Bachelor of Edenvale, 1; Master E. Cochrane's Nabob of Newholme, 2; Master E. J. O'Connor's General of Oakvale, 3.

Cow or heifer giving greatest yield of butter fat for twenty-four hours under Babcock test, as above: R. Mears's Tulip of Morden, 1; J. F. Cochrane's Trixie of Newholme, 2; B. O'Connor's Fairy Queen 2nd of Glenthorn, 3.

Groups.—Sire and three of his progeny: B. O'Connor's Gem's Plum of Hillview and progeny, 1; R. Mears's George of Nestles and progeny, 2; R. J. Morgan's Royalist and progeny, 3. Two males and five females: B. O'Connor, 1; A. Pickels, 2; R. J. Morgan, 3. Sires' progeny stakes group: A. Pickels, 1; B. O'Connor, 2.

Bull, 4 years old and over: F. O. Hayter's Sovereign of Warden, 1; Crowther Brothers' Plum of Hillview, 2; R. J. Morgan's Royalist 2nd of Fairview, 3; W. Middleton's Gay Boy of Tyrone Villa, 4.

Champion Illawarra milking shorthorn bull: E. O. Hayter's Sovereign of Warden. Reserve champion: B. O'Connor's Charm's Duholow of Oakvale.

GUERNSEYS.

Judge, Mr. W. Carter.

Bull, 3 years and over: T. S. Champney's Moonstone, 1 and champion.

FRIESIANS.

Judge, Mr. D. Hutchison.

Cow, 4 years and over, in milk: S. H. Hosking's Margaret Anglin 2nd of Berry, 1; P. P. Falt's Dairymead, 2; Grindles Limited's Lady Creamelle, 3. 3 and under 4 years, in milk: C. Behrendorff's Fanny of Inavale. Heifer, 2 and under 3 years, in milk: F. G. Brown's Maud Rooker Korndyke. Cow, 3 years or over, in calf 6 months, or dry: S. H. Hosking's Duchess of Hanover of Berry. Heifer, 2 and under 3 years, dry: S. H. Hosking's Psyche 2nd of Gwithian, 1; P. P. Falt's Malba of Ryfield, 2. Heifer, 1 and under 2 years: G. Newman's Hamburg of St. Athan, 1; F. G. Brown's Pandora 3rd of Moorombin, 2; Grindles Limited, Johanna of Wolston, 3. Heifer calf, 6 and under 12 months: G. Newman's Maud 4th of St. Athan, 1; C. Behrendorff's Fanny 2nd of Inavale, 2; F. G. Brown's Moorombin Doral, 3.

Children's Calf Class.—Heifer calf, 6 and under 12 months: Master P. R. Alexander's Irene Segis Denmark, 1; Master W. Weaker's Lovely of Glen Carmal, 2; Miss Nellie Falt's Queenie of Ryfield, 3.

Champion Friesian cow: S. H. Hosking's Margaret Anglin 2nd of Berry. Reserve champion: F. G. Brown's Maud Rooker Korndyke.

Bull, 4 years and over: G. Newman's Dominion Domino's Dutch Boy, 1; S. S. Holmes's Marso of Berry, 2; C. Behrendorff's Cordyline Mascot, 3. 3 and under 4 years: Grindles Limited's Black Prince, 1; E. C. McConnel's Victory Paxton of Monavale, 2; E. J. Wecker's Prince Colantha Oaklea, 3. 2 and under 3 years: R. G. McLeod's Menelaus of St. Athan. 1 and under 2 years: F. Pearce's Daman of St. Gwithian, 1; R. S. Alexander's Sir Cluny Colantha, 2; M. Mumford's Star of Cressbrook, 3. 6 and under 12 months: G. Newman's Dunce of St. Athan, 1; C. Behrendorff's Sundial of Inavale, 2; E. J. Wecker's King Hector of Glen Carmal, 3.

Children's Calf Class.—Bull calf, 6 and under 12 months: Master G. Hosking's Pontiac of St. Gwithian.

Cow or heifer giving greatest yield of butter fat for twenty-four hours under Babcock test, as above: S. H. Hosking's Margaret Anglin 2nd of Berry, 1; P. P. Falt's Oaklea Noreen, 2; P. P. Falt's Dairymaid, 3; Grindles Limited's Lady Creamelle, 4.

Group.—Sire and three of his progeny, 6 months old and over: C. Behrendorff. Two males and five females: G. Newman.

Champion Friesian bull: R. G. McLeod's Menelaus of St. Athan. Reserve champion: Grindles Limited's Black Prince.

FAT CATTLE.

Judge, Mr. H. Friend.

Champion, best bullock: W. Ross Munro. Pen of three bullocks, over 4 years, uniform breed: I. J. and M. S. Moore, 1; J. Collins and Sons, 2. Three bullocks, 3 to 4 years, suitable freezing, to weigh 650 to 750 lb.: I. J. and M. S. Moore. Three bullocks, not over 4 years, most suitable for export, to weigh 600 to 800 lb.: Wagner and Surawski. Three Hereford bullocks, under 4 years: I. J. and M. S. Moore, 1; Godfrey Morgan, 2. Three bullocks, under 4 years, uniform breed: I. J. and M. S. Moore, 1; Wagner and Surawski, 2. Three bullocks, not over three years: I. J. and M. S. Moore. Three bullocks, most suitable freezing, H. J. Winton. Three steers, over 2 and under 3 years: I. J. and M. S. Moore. Bullock, not over 6 years: W. Ross Munro: 1 and champion; H. Mort and Son, 2. Bullock, under 4 years: I. J. and M. S. Moore, 1; J. Collins and Sons, 2. Steer, under 3 years: I. J. and M. S. Moore, 1. Cow, not over 6 years: Macansh Estates Limited, 1. Heaviest bullock: W. Ross Munro; weight 18 cwt. 2 qr. 7 lb. Bullock for export purposes: I. J. and M. S. Munro, 1; J. Collins and Sons, 2. Bullock, for local consumption: H. Mort and Son, Limited, 1; J. Collins and Sons, 2.

STUD SHEEP.

Judge, Mr. W. B. Slade.

Merinos (strong-woolled).—Ram, 3 years and over: Lord Bros., 1, 2, and 3. Ram, 2 and under 3 years: H. M. Collins, 1 and 2; Lord Bros., 3. Ram, under 2 years, to have been shorn as a lamb: Lord Bros., 1 and 2. Ewe, 3 years and over: Lord Bros., 1 and 2. Ewe, 2 and under 3 years: Lord Bros., 1, 2, and 3. Ewe, under 2 years, to have been shorn as a lamb: Lord Bros., 1 and 2.

Merinos (fine-woolled).—Ram, 3 years and over: Lord Bros., 1 and 2. Ram, under 2 years, to have been shorn as a lamb: Lord Bros., 1. Ewe, 3 years and over: Lord Bros., 1 and 2. Ewe, under 2 years, to have been shorn as a lamb: Lord Bros., 1 and 2.

Groups (strong-woolled merinos).—Pen of five merino rams, over 1 and under 2 years: Lord Bros. Pen of five merino ewes, over 1 and under 2 years: Lord Bros.

Championships.—Strong-woolled merino ram, champion: H. M. Collins. Reserve champion: Lord Bros. Strong-woolled merino ewe, champion and reserve champion: Lord Bros. Fine-woolled merino ram, champion and reserve champion: Lord Bros. Fine-woolled merino ewe, champion and reserve champion: Lord Bros.

Judge, Mr. W. G. Brown.

British Breeds.—Lincolns, ewe, any age: S. E. Pullen. Romney Marsh, ram, any age: S. E. Pullen. Corriedales, ram, any age: J. H. Fairfax, 1 and 2. Ewe, any age: J. H. Fairfax, 1 and 2.

FAT SHEEP.

Judge, Mr. W. A. Nason.

Pen of five merino wethers, over 50 lb. weight: Jondaryan Estates Company of Australia, Limited, 1; E. J. McDonough, 2. Under 50 lb.: E. J. McDonough, 1; A. T. Creswick, 2. Most suitable for freezing: E. J. McDonough, 1; Jondaryan Estates Company, 2. Most suitable for butcher's trade: E. J. McDonough, 1; A. T. Creswick, 2. Pen of five merino lambs: S. E. Pullen, 2. Pen of five crossbred wethers, 70 lb. or over: Cecil Flemming, 1; J. H. Fairfax (Corriedales), 2. Pen of five crossbred wethers: S. E. Pullen, 1 and 2. Pen of five crossbred wethers: S. E. Pullen, 1; J. H. Fairfax, 2. Pen of five crossbred wethers, freezing quality: S. E. Pullen. Pen of five wethers, suitable freezing and export: E. J. McDonough. Pen of five crossbred lambs, suitable export as freezers: Stirling Bros., 1; S. E. Pullen, 2. Pen of five crossbred lambs, judged irrespective of weight: J. H. Fairfax, 1; Stirling Bros., 2. Pen of ten fat lambs, most suitable export: Stirling Bros. Pen of five lambs, most suitable freezing: J. H. Fairfax, 1; Stirling Bros., 2.

Single Exhibits.—Heaviest crossbred wether: S. E. Pullen, 1; J. H. Fairfax, 2. Heaviest merino wether: A. T. Creswick, 1; Jondaryan Estates Company, 2. Heaviest crossbred ewe: S. E. Pullen, 1; C. E. McDougall, 2. Heaviest merino ewe: Lord Bros.

SWINE.

Judge, Mr. E. J. Shelton.

Boars.—Over 18 months: W. J. Warburton, Northgate Item 2nd, 1; J. H. Cowen, Korumburra Sonny, 2. Between 9 and 18 months: W. J. Warburton, Northgate Duke 2nd. Between 6 and 9 months: J. H. Cowen, Cremorne Geoff, 1; W. J. Warburton, Northgate Sport, 2. Under 6 months: J. H. Cowen, Cremorne Fatty, 1; W. J. Warburton, Northgate Chance, 2. Pen of three Berkshire boars, under 16 weeks: J. H. Cowen, Cremorne Chief, Cremorne King, Cremorne Prince. Boar and three

progeny: J. H. Cowen, Korumburra Sonny and progeny, 1; W. J. Warburton, Northgate Item 2nd, 2. Champion boar: W. J. Warburton, Northgate Item 2nd. Reserve champion: J. H. Cowen, Korumburra Sonny.

Improved Berkshires.—Sows, over 18 months: H. B. Ellerton, Serang Maid, 1; J. H. Cowen, Lawrence Countess, 2; W. J. Warburton, Northgate Diamond Belle, 3. Between 9 and 18 months: W. J. Warburton, Northgate Diana. Between 6 and 9 months: W. J. Warburton, Black Tip, 1; Pretty Face, 2; C. Behrendorff, Inavale Daisy, 3. Under 6 months: W. J. Warburton, Lady Jane, 1; J. H. Cowen, Cremorne Peggy, 2; H. B. Ellerton, Goodna Dainty, 3. Pen of three sows, under 16 weeks: C. Behrendorff, 1; J. H. Cowen, 2. Champion sow: H. B. Ellerton, Serang Maid. Reserve champion: W. J. Warburton, Northgate Diana.

Yorkshires.—Boars, over 18 months: W. J. Warburton, Northgate My Lad. Between 9 and 18 months: W. J. Warburton, Newington Adventure. Under 6 months: W. J. Warburton, Major. Pen of three boars: W. J. Warburton. Champion boar: W. J. Warburton, Northgate My Lad. Reserve: W. J. Warburton, Newington Adventure.

Sows, over 18 months: W. J. Warburton, Northgate Gladdo. Between 9 and 18 months: W. J. Warburton, Northgate Shirley. Between 6 and 9 months: W. J. Warburton, Northgate Gem, 1; Northgate Daisy, 2. Under 6 months: W. J. Warburton, Northgate Snowy. Any age, in milk, with litter of not less than six suckers, not over 10 weeks old: W. J. Warburton, Northgate Ruth. Pen of three sows: W. J. Warburton. Champion sow: W. J. Warburton, Northgate Gladdo. Reserve champion: W. J. Warburton, Northgate Shirley.

Tamworths.—Boar, 18 months and over: W. W. Arnett, Sandy Macqueen, 1; J. H. Whittaker, Meddlesome Duke, 2. Boar, 9 months and under 18 months: J. H. Whittaker, Prince Royal. Boar, 6 months and under 9 months: Boorie Stud Farm, Ginger of Boorie, 1; Boorie Stud Farm, Sandy of Boorie, 2. Boar, under 6 months: W. W. Arnett, Rouse Hill Jim, 1; J. H. Whittaker, The Conqueror, 2; W. W. Arnett, Rouse Hill Sandy 2nd, 3.

Champion boar: W. W. Arnett, Sandy Macqueen. Reserve champion: J. H. Whittaker, Prince Royal.

Sow, 18 months and over: J. H. Whittaker, Knowles Princess 2nd, 1; J. H. Whittaker, Indian Princess, 2. Sow, 9 months and under 18 months: W. W. Arnett, Manning Ruby, 1; J. H. Whittaker, Perfection, 2; J. H. Whittaker, Poppy, 3. Sow, 6 months and under 9 months: J. H. Whittaker, Forget-me-not, 1; J. H. Whittaker, Wild Rose, 2; J. H. Whittaker, Blossom, 3. Sow, under 6 months: W. W. Arnett, Rouse Hill Myra, 1; W. W. Arnett, Rouse Hill Molly, 2; J. H. Whittaker, Pretty Polly, 3. Sow, any age, in milk: J. H. Whittaker, Perfection, 1; J. H. Whittaker, Carnation, 2.

Champion sow: W. W. Arnett, Manning Ruby. Reserve champion: J. H. Whittaker, Perfection.

Poland-China, boar, 6 months old and under 15 months: Boorie Stud Farm, Judge 3rd of Boorie.

Duroc-Jerseys, boar, any age: F. G. Brown's entry. Sow, any age: F. G. Brown's entries, 1 and 2.

Miscellaneous.—Three bacon pigs, any breed, 110 to 140 lb., estimated dressed weight: J. Fitzgerald, 1; C. Bright, 2. Three porker pigs, 60 to 80 lb.: H. McNeilly, 1; J. Fitzgerald, 2.

Additional Awards.—Poland-China, boar, 6 months old and under 15 months: J. T. Collett, Billy, 2. Pen of three young boars, under 6 months: J. T. Collett's entry. Pen of three young sows, under 6 months: J. T. Collett, 1; Boorie Stud Farm, 2.

FARM PRODUCE.

Judge, Mr. H. C. Quodling.

Maize, large yellow, improved yellow Dent: W. T. Beverley, 1; T. Fisher, 2. Horse tooth: H. Franke. Yellow Dent: H. Franke. Medium yellow, golden beauty: T. Fisher, 1; H. Lindner, 2. Yellow Dent: H. Franke, 1; H. C. Harvey, 2. Yellow peg tooth type: T. Fisher, 1; H. Franke, 2. Small yellow, early Leaming: H. Franke, 1; O. C. Granzien, sen., 2; C. J. Ryman, 3. Reid's funks or James's yellow Dent: H. Lindner. Early yellow Dent: H. Franke, 1; K. Haag, 2. Socalled ninety-day, small yellow: H. Franke, 1; C. S. Huxley, 2; K. Haag, 3. White varieties.—Large white: A. Loweke. Hickory king: O. C. Granzien, sen., 1; H. Franke, 2. Bone county, white: A. Loweke. Brazilian white: C. Behrendorff. Red varieties.—Red Hogan: H. Franke, 1; C. Behrendorff, 2; T. Fisher, 3. Sydney red: H. Franke. Red butcher: W. T. Beverley, 1 and 2. Small, early red: J. Logan. Sweet corn, any variety: H. Franke, 1 and 2. Pop corn: J. Donges, 1; H. Franke, 2. Maize ears, red: H. Franke. Wheat, medium strong flour: W. Dearling, 1; W. Auchter, 2 and 3. Weak flour wheat: W. Auchter. Best exhibit of wheat: Geitz Bros., 1; C. S. Huxley, 2; Geitz Bros., 3. Oats, Algerian or Sunrise: W. Dearling, 1; C. Behrendorff, 2. Rye: K. Haag. Hay, lucerne, best dry: Major B. C. Bell, 1; J. Campbell, 2. Hay, lucerne, sweated: J. Campbell, 1; C. Behrendorff, 2. Oaten: C. S. Huxley, 1; T. Fisher, 2. Wheaten: W. Auchter. Straw: W. Auchter 1; C. S. Huxley, 2. Soudan grass: H. Franke, 1; W. Auchter, 2. Maize, stover: H. Franke, 1; C. S. Huxley, 2. Millet or panicum: T. Fisher, 1; H. Franke, 2. Rhodes: W. Auchter. Bush: W. Auchter. Three sheaves, oaten, Algerian: T. Fisher, 1; J. Donges, 2. Three sheaves, oaten, Tartarian: B. H. W. Berlin, 1 and 2. Three sheaves, wheaten: W. Auchter, 1; J. Donges, 2. Chaff, lucerne, dry: W. T. Beverley, 1; J. E. Stanton, 2. Sweated: Major B. C. Bell, 1; J. Campbell, 2; W. Dearling, 3. Oaten: C. S. Huxley, 1; C. J. Ryman, 2. Wheaten: C. S. Huxley, 1; L. Auchter, 2. Canary: H. Franke. Soudan grass: W. Auchter, 1; H. Franke, 2. Millet or panicum: H. Franke, 1; K. Haag, 2; J. Logan, special 1st. Grass hay: H. Franke, 1; W. Auchter, 2. Wheaten straw: W. Auchter, 1; W. Dearling, 2. Straw: J. Campbell, 1; H. Franke, 2; W. Auchter, 3. Ensilage (chaff): F. G. Brown, 1; C. Behrendorff, 2. Ensilage (whole stalk): F. G. Brown, 1 and 2. Saccharine sorghums.—Sacchaline: E. J. Keys. Sorghum saccharatum: H. Franke. Planters' friend: B. H. W. Berlin, 1; H. Franke, 2; C. Behrendorff, 3. Amber cane: H. Franke, 1; K. Haag, 2. Soudan grass: C. Behrendorff. Broom millet, seed: H. Franke. Panicum and fodder millet.—Liberty millet: B. H. W. Berlin, 1; C. S. Huxley, 2; J. Campbell, 3. White seeded French millet: T. Fisher. Japanese millet: B. H. W. Berlin. White panicum: B. H. W. Berlin, 1; C. Behrendorff, 2; H. Lindner, 3. Manchurian millet: H. Lindner. Pasture grass seeds.—Lucerne: C. S. Huxley, 1; Major B. C. Bell, 2. Linseed: W. Dearling. Beans and peas.—Haricot: C. S. Huxley. Cowpeas, black: C. Behrendorff. Cowpeas, clay-coloured: C. S. Huxley, 1; K. Haag, 2. Cowpeas, large black-eyed Susan: S. C. Huxley, 1; K. Haag, 2. Cowpeas, any other variety: K. Haag. Yorkshire Hero peas: K. Haag. Miscellaneous.—Giant Russian sunflower: J. Donges. Canary seed of commerce: C. S. Huxley, 1; K. Haag, 2. Cotton, long staple (judge, Mr. D. Jones): W. Grimsey, 1; J. Oln, 2; W. Thompson, 3. Potatoes, Guyra Blues, Coronations, or Commonwealths: C. Seiler, 1; H. Franke, 2; H. C. Harvey, 3. Manbattans: C. Seiler. Brownells, any variety other than Satisfaction: H. Franke, 1; C. J. Ryman, 2. Satisfaction: H. Franke. Carmens: H. C. Harvey. Collection English: H. Franke, 1; C. Seiler, 2. Sweets, red or pink, table variety: J. Seeleither. Yellow Spanish, table variety: J. Seeleither. Champion Brownell: H. Franke. Crown pumpkins, table: O. C. Granzien, sen., 1; J. Logan, 2; H. C. Harvey, 3. Ironbark, table: J. Campbell, 1; H. C. Harvey, 2. Silver Nugget, table: W. T. Beverley, 1; J. Campbell, 2; H. C. Harvey, 3. Pumpkins, cattle: A. Granzien. Marrows: H. C. Harvey. Piemelons: J. Seeleither. Arrowroot: J. Seeleither. Castor oil bean: H. Lindner.

Maize ears, large yellow: H. Franke. Medium yellow: H. Franke. Small yellow: K. Haag, 1; H. Franke, 2. Large white: A. Loweke, 1; H. Franke, 2. Any white, variety: A. Loweke, 1 and 2. Small red grain (early): H. Franke, 1. Sweet corn: H. Franke. Popcorn: J. Donges.

Champion maize exhibit: W. T. Beverley. Champion maize ears exhibit: H. Franke.

Barley.—Champion malting barley: W. Dearling.

Hay.—Champion collection: William Auchter.

Chaff.—Champion collection oaten, wheaten, lucerne, and canary chaff: William Auchter.

Potatoes.—Champion blue varieties: C. Seiler. Champion brown varieties: H. Franke. Champion white varieties: H. C. Harvey.

FRUIT.

Judge, Mr. W. Soutter.

Six uncured lemons: W. K. Reach, 1; R. Percival, 2. One case cured lemons: F. Nicklin. Six lemons, suitable for peel: E. Curtis, 1; R. Percival, 2. Three bunches cavendish bananas: W. J. Parker, 1; B. C. Peachey, 2. Three cases bananas: M. H. Gray, 1; Thomas Ivans, 2. Three cases smoothleaf pineapples, packed for export: H. Willmott, 2. Three cases Ripley Queen pineapples, packed for export: H. B. Aplin. Six pineapples, smoothleaf: H. Willmott, 1; W. Dart, 2. Six pineapples, Ripley Queen: H. B. Aplin, 1; H. Willmott, 2. Six pineapples, roughleaf: H. Willmott. Three cases oranges, packed for export, but unwrapped: W. Dart. Three cases oranges, packed for export, wrapped: W. Dart. Six Tahiti limes: W. Dart, 1; C. J. Frost, 2. Six citrons: E. Curtis. Six Emperor of Canton mandarins: E. P. Noakes, 1; W. Hooper, 2. Six scarlet mandarins: J. Steggall, 1; J. C. K. Lethbridge, 2. Six Glen Retreat mandarins: W. Hooper, 1; J. C. K. Lethbridge, 2. Six mandarins, any other variety: W. Dart, 1; E. P. Noakes, 2. Six Valentia oranges, late: R. Percival. Six Mediterranean sweet oranges: W. Hooper. Six Sabina oranges: W. Dart. Six Washington navel oranges: R. Percival, 1; W. Hooper, 2. Six seedling oranges: J. C. K. Lethbridge, 1; W. Hooper, 2. Six Seville oranges: Mrs. R. P. Gale, 1; W. Dart, 2. Six poor man's oranges: C. J. Frost. Six grape fruit: J. A. M. Macnaught. Any new superior variety of citrus fruit: H. K. Roach. Dish of passionfruit: F. G. Gipps, 1; A. Hartley, 2. Six boxes Aurie strawberries: J. A. C. Jackes. Three boxes strawberries: J. A. C. Jackes. Three papaws: E. Parker, 1; W. J. Parker, 2. Six custard apples: R. Percival. Dish of tree tomatoes: A. Wyllie. Granny Smith apples, for export: The Summit Fruitgrowers' and Progress Association, 1; M. E. Sewell, 2. Any other variety apples, for export: The Summit Fruitgrowers' and Progress Association, 1; David Pfrunder, 2.

APICULTURE.

Judge, Mr. W. F. Lyon.

Honey, standard colour, light: A. Smith, 1 and 2; A. T. Baker, 3. Golden: S. L. Uhlmann, 1 and 3; A. Smith, 2. Dark: A. T. Baker, 1; A. Gambling, 2; S. L. Uhlmann, 3. Granulated honey, fine grain: A. Gambling, 1; A. Smith, 2; A. T. Baker, 3. Granulated honey, coarse grain: S. L. Uhlmann, 1; A. S. Douglas, 2; A. T. Baker, 3. Comb and extracted honey: S. L. Uhlmann, 1 and 2; A. S. Douglas, 3. Blocks solid honey, 1 lb. nominal weight: A. T. Baker, 1 and 2. Extracted honey (novice class): J. Jones. Clarity exhibit, best jar extracted honey: A. Gambling. Extracting frame of comb honey, not less than 50 square inches: S. L. Uhlmann. Extracting frame of comb honey, not less than 100 square inches: A. S. Douglas. Beeswax, natural yellow: A. Smith. White: A. Smith. Beeswax for retail trade, white, not less than 4 lb., in tablets: S. L. Uhlmann. Beeswax for retail trade, natural yellow: S. L. Uhlmann, 1; A. T. Baker, 2. Beeswax in trophy form: A. Gambling. Collection of articles showing the uses to which beeswax can be put: A. S. Douglas. Collection and display of apiary products (not by-products), in all forms, suitable for shop window display: A. Smith, 93 points, 1; A. Gambling, 92 points, 2. Observatory hive of Italian bees, showing queen bee: S. L. Uhlmann, 1; J. Jones, 2. Honey vinegar: A. T. Baker. Collection of confectionery made with honey: Mrs. A. Pitkeathly. Collection of cakes made with honey: Mrs. A. Pitkeathly. Collection showing medicinal uses of honey: A. S. Douglas. Champion prize for the best honey exhibited, in classes 1 (light), 2 (golden), 3 (dark), 8 (novice), and 9 (clarity exhibit): J. Jones (Alderley).

SCIENCE NOTES.

By EDMUND JARVIS, Entomologist, Bureau of Sugar Experiment Stations.

FACTORS LIMITING THE INCREASE OF SCOLIID PARASITES.

(1.) *Fungus attacking Larvæ and Adults of Campsomeris tasmaniensis* Sauss.

Being aware that the entomogenous fungus *Metarrhizium anisopliæ* (Metsch.) Sor. is not exclusively parasitic on larvæ, but invades also the adult form of quite a number of insects, experiments were initiated by the writer during June, 1919, with view to determining whether wasps of the genus *Campsomeris* were immune from attack.

Details relating to the technique employed need not be given here; it being sufficient for the present purpose to state that in less than a week after infection of the soil several caged wasps were found dead and covered with green spore masses.

The fungus broke through first between the antennal joints, an indication, perhaps, that disease had been contracted while the insect was forcing its way through the infected soil.

Two wasps placed in cages on 18th June were found dead the following day, one being underground and the other lying on the surface with a particle of milky-looking matter exuding from the anus. When next examined (forty-eight hours after introduction to cages), the fungus had appeared externally on legs and antennæ.

In the light of our present knowledge regarding the action of the green Muscardine fungus under field conditions, its occurrence would not be likely to materially affect the increase of our spring and summer broods of *Campsomeris*. During autumn months, however, I am disposed to believe that the number of wasps victimised by this vegetable parasite may not only equal but perhaps exceed the percentage of cane-grubs destroyed by the fungus in question.

This view appears reasonable when one considers that our digger-wasp, during its aerial existence of about two months, tunnels 9 inches or more into the ground once or twice each day, visiting all sorts of localities and classes of soils, and constructing a subterranean chamber at the end of every drive, and would, therefore, at some time during these excavations be very likely to run again soil containing spores of the "Green Muscardine" fungus.

On the other hand, we know that cane-grubs, when located under a stool, usually remain there, close to their food, seldom moving about more than is necessary, and accordingly incurring far less risk of infection from spores of entomogenous fungi.

A young larvæ of *C. tasmaniensis* Sauss. derived from an egg laid on 24th May on *Lepidoderma albohirtum* Waterh. was noticed, some days later, to be covered with *Metarrhizium* fungus.

Curiously enough, the host-grub was not in the least affected, although the maggot of the parasite had been dead some days, and masses of ripe spores had developed.

(2.) *Premature Death of Host from Abnormal Stinging.*

Occasionally a digger-wasp, instead of paralysing its host-grub in the usual manner (see Bull. No. 7, Qld. Bur. Sug. Expt. Stations, Div. Ent., p. 21), deals an almost fatal thrust of the sting, delivered perhaps in a wrong place by mistake, under stress of danger or excitement consequent upon having made a false move whilst attacking; for it must not be forgotten that this strange combat to the death between grub and parasite takes place below ground in the dark, where the dangerous proximity of mandibles and sting being, presumably, invisible to either party, would need to be instantly located by some instinctive sense of feeling that we do not understand.

The economic significance of such abnormal stinging, however, does not appear to be appreciated by the parasite, since it will oviposit as usual on such over-stung hosts, although the resultant maggot, after hatching, be doomed to perish owing to premature decay of the former. A third-stage grub of *albohirtum*, for example, was stung in this manner by a specimen of *C. radula* on 17th April and died three days later.

The effect produced by such abnormal stinging is rather remarkable. Instead of becoming flaccid as usual, the grub stiffens and appears bloated, as though it had been boiled, assuming a U-shaped form, and remaining quite rigid in the cell until after death.

THE DAIRY HERD, QUEENSLAND AGRICULTURAL COLLEGE, GATTON.

MILKING RECORDS OF COWS FOR JULY, 1922.

Name of Cow	Breed.	Date of Calving.	Total Milk.	Test.	Commercial Butter.	Remarks.
			lb.	%	lb.	
Dear Lassie ...	Ayrshire ...	19 June, 1922	960	3.9	43.80	
Hedges Nattie ...	Friesian ...	20 May, "	780	4.1	37.50	
College Cold Iron	Jersey ...	25 Jan., "	540	5.7	36.30	
Prim ...	Friesian ...	6 Feb., "	930	3.1	33.60	
Miss Fearless ...	Ayrshire ...	30 May, "	720	3.8	32.10	
Songstress ...	" ...	4 July, "	756	3.4	29.96	
Dawn of Warragaburra	Jersey ...	17 May, "	480	5.1	28.80	
Little Buttercup...	Friesian ...	12 Dec., 1921	690	3.5	28.20	
Lute ...	Ayrshire ...	8 Jan., 1922	540	4.2	26.70	
Snowflake ...	Shorthorn...	20 Feb., "	570	4.0	26.40	
Skylark ...	Ayrshire ...	7 Feb., "	510	4.4	26.10	
Gay Lassie ...	" ...	20 Feb., "	420	5.2	25.80	
Miss Betty ...	Jersey ...	17 May, "	420	5.2	25.80	
Buttercup ...	Shorthorn...	28 Oct., 1921	576	3.8	25.60	
College Prima Donna	Friesian ...	27 Nov., "	540	3.9	24.60	
Magnet's Leda ...	Jersey ...	8 Feb., 1922	450	4.7	24.60	
College Cobalt ...	" ...	3 April, "	420	4.7	23.10	
College Nancy ...	Friesian ...	16 June, "	510	3.7	21.90	
College Ma Petite	Jersey ...	5 Feb., "	390	4.8	21.90	
La Hurette Hope ...	" ...	30 June, "	465	4.0	21.70	
Rosine ...	Ayrshire ...	18 May, "	510	3.6	21.30	
Sheila of Nundorah	Guernsey ...	16 April, "	360	5.0	21.00	
College Wildflower	Jersey ...	10 Dec., 1921	360	5.0	21.00	
Auntie's Lass ...	Ayrshire ...	31 Oct., "	434	4.1	20.77	
College Nita ...	Friesian ...	26 Feb. 1922	480	3.7	20.70	
Lady Mitchell ...	" ...	20 Dec., 1921	450	3.9	20.40	
Lady Annette ...	Ayrshire ...	2 Jan., 1922	360	4.8	20.10	

REPORT ON EGG-LAYING COMPETITION, QUEENSLAND AGRICULTURAL COLLEGE, JULY, 1922.

Extremely cold weather was again experienced during the month of July, which considerably upset the laying. One death occurred, bowel trouble being the cause, otherwise we had a very good result for the month. Several of the leading pens are again doing good work. The White Leghorns are in the lead with a score of 148 eggs to Mr. N. A. Singer's pen; also his B bird has made a good run, unbroken, of 48 eggs. Mr. C. H. Singer's pen takes second place with a score of 147, also White Leghorns. The third pen is that owned by Messrs. W. and G. W. Hindes, with a score of 120. In the heavy breeds the best score for the month is 122 made by Mr. C. C. Dennis's pen, R. Holmes being second with 120, and R. Burns third with 116 eggs. The following are the individual records:—

Competitors.	Breed.	July.	Total.
--------------	--------	-------	--------

LIGHT BREEDS.

*W. and G. W. Hindes ...	White Leghorns ...	120	416
*N. A. Singer ...	Do. ...	148	411
C. H. Singer ...	Do. ...	147	392
*Bathurst Poultry Farm ...	Do. ...	92	372
*Geo. Trapp ...	Do. ...	98	332
*T. Fanning ...	Do. ...	109	332
*W. A. Wilson ...	Do. ...	102	328
J. H. Jones ...	Do. ...	91	328

EGG-LAYING COMPETITION—*continued.*

Competitors.	Breed.	July.	Total.
LIGHT BREEDS— <i>continued.</i>			
*Mrs. L. Andersen ...	White Leghorns ...	103	319
A. G. C. Wenck ...	Do. ...	83	317
*S. L. Grenier ...	Do. ...	97	310
*W. Becker ...	Do. ...	85	303
*G. Williams ...	Do. ...	96	297
*O. Goos ...	Do. ...	88	293
*J. M. Manson ...	Do. ...	103	292
*H. P. Clarke ...	Do. ...	102	291
B. Hawkins ...	Do. ...	85	291
*R. Gill ...	Do. ...	112	291
J. Purnell ...	Do. ...	75	285
A. Maslin ...	Do. ...	100	279
*R. C. Cole ...	Do. ...	96	272
*Mrs. E. White ...	Do. ...	86	271
*H. Fraser ...	Do. ...	76	271
*J. W. Newton ...	Do. ...	74	268
*C. Goos ...	Do. ...	81	255
*Oakleigh Poultry Farm ...	Do. ...	97	242
T. H. Craig ...	Do. ...	65	242
G. F. Richardson ...	Do. ...	78	240
*M. F. Newberry ...	Do. ...	98	236
*J. W. Short ...	Do. ...	93	234
*C. M. Pickering ...	Do. ...	93	236
*Mrs. R. Hodge ...	Do. ...	97	232
E. Stephenson ...	Do. ...	51	230
*F. Birchall ...	Do. ...	84	226
*Thos. Taylor ...	Do. ...	89	222
N. J. Nairn ...	Do. ...	75	222
B. C. Bartlem ...	Do. ...	56	220
*R. C. J. Turner ...	Do. ...	87	213
*E. A. Smith ...	Do. ...	64	211
E. Symons ...	Do. ...	69	203
A. Anders ...	Do. ...	38	178
Brampton Poultry Farm ...	Do. ...	59	158
H. Trappett ...	Brown Leghorn ...	59	132
Parisian Poultry Farm ...	Do. ...	13	24

HEAVY BREEDS.

*A. E. Walters ...	Black Orpingtons ...	106	386
*R. Holmes ...	Do. ...	120	352
*R. Burns ...	Do. ...	116	341
*H. M. Chaille ...	Do. ...	108	339
Jas. Hutton ...	Do. ...	105	330
*T. Hindley ...	Do. ...	112	328
Mrs. A. Kent ...	Do. ...	78	327
Wambo Poultry Farm ...	Do. ...	50	315
*Rev. A. McAllister ...	Do. ...	85	279
*E. F. Dennis ...	Do. ...	88	279
*C. C. Dennis ...	Do. ...	122	265
*J. Potter ...	Do. ...	111	258
Mrs. A. E. Gallagher ...	Do. ...	84	258
Mrs. L. Maund ...	Do. ...	87	240
R. Innes ...	Do. ...	13	231
V. J. Rye ...	Do. ...	82	212
C. Doan ...	Do. ...	91	208
Jas. Hitchcock ...	Do. ...	61	199
H. B. Stephens ...	Do. ...	70	186
C. Rosenthal ...	Do. ...	54	181

EGG-LAYING COMPETITION—*continued.*

Competitors.	Breed.	July.	Total.
HEAVY BREEDS— <i>continued.</i>			
W. Becker	Chinese Langshans ...	109	178
*Parisian Poultry Farm ...	Black Orpingtons ...	97	166
W. C. Trapp ...	Do. ...	77	151
*J. E. Smith ...	Plymouth Rocks ...	60	84
R. Burns ...	Silver-laced Wyandottes ...	62	83
*Miss L. Hart ...	Rhode Island Reds ...	5	6
Total ...	...	6,060	17,896

* Indicates that the pen is being single tested.

DETAILS OF SINGLE HEN TESTS.

Competitors.	A.	B.	C.	D.	E.	F.	Total.
--------------	----	----	----	----	----	----	--------

LIGHT BREEDS.

W. and G. W. Hindes ..	83	57	76	68	76	56	416
N. A. Singer ..	56	83	61	71	67	73	411
Bathurst Poultry Farm ..	53	48	67	70	79	55	372
Geo. Trapp ..	69	44	42	63	55	59	332
T. Fanning ..	37	75	61	65	77	17	332
W. A. Wilson ..	51	47	42	69	53	66	328
Mrs. L. Andersen ..	70	34	58	55	47	55	319
S. L. Grenier ..	47	27	60	56	59	61	310
W. Becker ..	43	28	63	49	52	68	303
G. Williams ..	42	55	58	50	46	46	297
O. Goos ..	48	32	59	69	54	31	293
J. M. Manson ..	48	33	61	31	68	51	292
H. P. Clarke ..	53	33	51	57	52	45	291
R. Gill ..	58	55	62	43	29	44	291
R. C. Cole ..	53	56	58	21	43	41	272
Mrs. E. White ..	60	11	47	37	61	55	271
H. Fraser ..	48	61	46	37	32	47	271
J. W. Newton ..	66	46	54	26	50	26	268
C. Gos ..	30	30	27	51	66	51	255
Oakleigh Poultry Farm ..	52	29	45	41	28	47	242
M. F. Newberry ..	41	23	30	69	24	49	236
J. W. Short ..	41	42	53	32	21	45	234
C. M. Pickering ..	57	53	21	36	43	23	233
Mrs. R. Hodge ..	63	10	36	38	53	32	232
F. Birchall ..	40	43	12	35	50	46	226
Thos. Taylor ..	55	22	44	40	39	22	222
R. C. J. Turner ..	38	24	49	46	42	14	213
E. A. Smith ..	53	24	52	42	17	23	211

HEAVY BREEDS.

A. E. Walters ..	61	59	61	59	73	73	386
R. Holmes ..	46	71	59	59	54	63	352
R. Burns ..	48	64	44	64	60	61	341
H. M. Chaille ..	75	48	66	63	57	30	339
T. Hindley ..	30	59	27	90	88	34	328
Rev. A. McAllister ..	52	60	74	27	9	57	279
E. F. Dennis ..	50	43	67	7	49	63	279
C. C. Dennis ..	43	55	51	35	47	34	265
J. Potter ..	37	47	56	48	52	18	258
Parisian Poultry Farm ..	15	34	36	8	39	34	166
J. E. Smith ..	0	22	11	7	21	23	84
Miss L. Hart ..	0	3	1	2	0	0	6

CUTHBERT POTTS, Principal.

NATIONAL UTILITY POULTRY BREEDERS' ASSOCIATION COMPETITION.

By arrangement with the Council of the National Utility Poultry Breeders' Association the results of their egg-laying competition will hereafter be published monthly.

During August, 2655 eggs were laid by the birds in the N.U.P.B.A. competition at Zillmere, on an average of just over 22 eggs per bird. No. 79, a White Leghorn belonging to Mr. W. Bliss, laid 31 eggs in the month. The birds generally are in good health, and doing well. No. 85 was replaced and previous score struck out. Details:—

Pen No.	Owner.	August.	Total.	Pen No.	Owner.	August.	Total.
WHITE LEGHORNS.							
29	A. S. Walters ...	26	125	10	P. Ruddick ...	23	88
2	A. Niel ...	26	118	69	A. Hodge ...	22	88
33	J. Purnell ...	27	118	8	J. Harrington ...	19	87
62	H. Sturman ...	24	115	41	G. Williams ...	21	87
19	L. Anderson ...	24	113	42	G. Williams ...	23	87
43	J. Davies ...	25	113	52	F. R. Koch ...	25	87
66	A. Cowley ...	25	112	46	H. Needs ...	21	86
38	Carinya Poultry Farm	19	111	59	C. M. Pickering ...	21	85
77	Kelvin Poultry Farm	27	111	17	R. Shaw ...	22	84
27	Oakleigh Poultry Farm	26	109	67	R. D. Chapman ...	19	84
72	Enroh Pens ...	24	109	22	E. Stevenson ...	20	80
7	J. Harrington ...	24	107	54	A. W. Ward ...	23	80
25	P. F. Adams ...	23	107	26	D. F. Adams ...	23	79
64	G. Trapp ...	26	106	73	A. F. Knowles ...	22	79
12	J. Potter ...	24	105	18	R. Shaw ...	23	78
34	J. Purnell ...	24	105	56	W. H. Lingard ...	19	77
61	H. Sturman ...	22	104	58	M. Newberry ...	28	77
47	M. J. Lyons ...	23	104	40	P. J. Fallon ...	23	76
16	F. Flood ...	25	103	79	W. Bliss ...	31	76
70	A. Hodge ...	23	103	51	F. R. Koch ...	22	75
24	M. H. Campbell ...	20	100	76	A. J. Bourne ...	24	74
55	W. H. Lingard ...	24	97	65	A. Cowley ...	20	72
36	Parisian Poultry Farm	18	96	37	Carinya Poultry Farm	23	71
63	G. Trapp ...	24	96	15	T. Flood ...	16	70
28	Oakleigh Poultry Farm	17	95	5	Wombo Poultry Farm	18	66
30	A. S. Walters ...	19	95	20	L. Anderson ...	23	66
35	Parisian Poultry Farm	21	95	60	C. M. Pickering ..	19	64
68	R. D. Chapman ...	23	95	81	E. C. Raymond ...	22	64
82	E. C. Raymond ...	19	94	14	J. Hutton ...	20	63
44	J. J. Davies ...	22	94	11	J. Potter ...	15	61
39	P. J. Fallon ...	22	93	31	R. H. Woodcock	17	60
48	M. J. Lyons ...	24	93	45	H. Needs ...	19	60
57	M. Newberry ...	19	93	50	R. Turner ...	21	56
74	A. F. Knowles ...	19	93	71	Enroh Pens ...	24	55
6	Wombo Poultry Farm	21	92	80	W. Bliss ...	22	53
9	P. Ruddick ...	24	91	28	M. H. Campbell ...	28	51
13	J. Hutton ...	23	91	78	Kelvin Poultry Farm	22	47
53	A. W. Ward ...	21	91	1	A. Neil ...	3	45
49	R. Turner ...	21	89	3	W. Becker ...	23	43
				4	W. Becker ...	17	42
				32	R. H. Woodcock	17	31
				75	A. J. Bourne ...	23	26
				21	E. Stevenson ...	21	24

**NATIONAL UTILITY POULTRY BREEDERS' ASSOCIATION
COMPETITION—continued.**

Pen No.	Owner.	August.	Total.	Pen No.	Owner.	August.	Total.
BLACK ORPINGTONS.							
107	E. Walters ...	28	115	99	L. J. Prichard ...	21	87
89	T. Brotherton ...	24	114	102	Parisian Poultry Farm	21	83
96	R. A. Boulton ...	27	112				
88	W. A. Blake ...	29	109	106	H. Pearce ...	26	82
92	P. C. Dennis ...	28	104	84	J. Hutton ...	26	80
105	H. Pearce ...	24	104	110	Wambo Poultry Farm	22	76
101	Parisian Poultry Farm	22	102	109	Wambo Poultry Farm	20	72
86	Kidd Bros. ...	20	98				
103	J. Potter ...	18	98	110	A. Neil ...	24	67
95	R. A. Boulton ...	28	95	94	E. F. Dennis ...	8	64
108	G. Walters ...	23	95	89	T. H. Brotherton	28	63
104	J. Potter ...	24	94	87	W. A. Blake ...	23	60
93	E. F. Dennis ...	24	93	98	Enroh Pens ...	20	57
100	L. J. Pritchard ...	24	93	112	A. Neil ...	25	43
83	J. Hutton ...	22	91	97	Enroh Pens ...	18	24
91	C. C. Dennis ...	26	91	85	Kidd Bros. ...	10	10
OTHER BREEDS.							
118	P. H. Jones ...	25	110	119	T. J. Carr ...	24	62
120	T. J. Carr ...	25	91	115	G. and W. Hinds	20	52
117	J. H. Jones ...	20	90	113	Parisian Poultry Farm	21	45
116	D. and W. Hinds	20	84				
114	Parisian Poultry Farm	22	68				

CERTIFICATES OF SOUNDNESS.

Certificates of Soundness as under-listed were issued in the course of August, 1922:—

Name of Stallion.	Breed.	Period for which Certificate issued.	Owner's Name.	Owner's Address.
Pride of Glenore	Clydesdale ..	Life ..	H. Kilvington..	Glenore Grove, Forest Hill
Baron Windemere	Clydesdale ..	12 months	G. Elliot ..	Laidley
Statesman ..	Clydesdale ..	12 months	G. Elliot ..	Laidley
Crystal River	Clydesdale ..	12 months	S. E. Pullen ..	Prairie Plain, Wyalla
Paddington ..	Blood ..	Life ..	Queensland Government	Dillalah State Station
Soldiers March	Blood ..	Life ..	E. Bagley ..	Chester Street, Valley
Salopian ..	Blood ..	Life ..	Duncan Bros. ..	Childers
Ercanil ..	Blood ..	Life ..	Hon. A. H. Whittingham	Brisbane
The Joker ..	Trotting ..	Life ..	J. E. Moore ..	Maryborough
King Bells ..	Trotting ..	Life ..	R. Cocks ..	Sherwood Road, Too-wong
Tom Holmes..	Trotting ..	Life ..	A. W. Baulch ..	Bald Hills
Bonnie Lad ..	Pony ..	12 months	F. Tucker ..	Sale Yards, New-market
Ludo ..	Pony ..	12 months	E. Pocock ..	Palmer Street, Windsor
Little Harold	Pony ..	12 months	G. E. Jackson ..	Eagle Street, Brisbane
Bonny ..	Pony ..	12 months	E. A. Taylor ..	Nudgee

ORGANISATION OF THE AGRICULTURAL INDUSTRY.

The Queensland Producers' Association.

A Record of Progress and Achievement.

The last Regular Meeting of the Council of Agriculture was held in the Council Room, Teachers' Training College Building, Turbot street, Brisbane, on Friday, 25th August, 1922. Subjoined is a complete record of Proceedings covering many matters of first importance to the Farming Industry.

Attendance.—

The Vice President (Mr. J. Purcell) was in the chair; and there were also present Messrs. J. W. Davidson, E. Graham, W. J. Short, H. C. Quodding, and J. D. Story (Administration); Messrs. J. E. Dean, W. Purcell, T. Flood Plunkett, H. Keefor, and J. T. Tod (Dairy Industry); Messrs. S. C. Howe, W. Ranger, H. I. H. Ross, and F. M. Runkin (Fruit Interests); Messrs. G. Batchlor, C. V. Hives, T. A. Powell, and C. H. Pritchard (Sugar Industry); and Messrs. T. Muir and R. Swan (Wheat Growers).

The Council passed the following resolutions:—

1. *Cold Stores at Hamilton—*

That the Chairman of the Dairy Committee and the Chairman of the Fruit Committee be advised to keep in touch as far as possible with the progress of the work in connection with the Cold Stores at Hamilton, so as to ensure that the accommodation promised by December next will be completed by that time.

2. *Standards for Apples—*

That the Department of Agriculture be advised that as a result of the recent National Conference held in Melbourne it is proposed to revise the Customs Regulations dealing with certain standards; and that in the circumstances the Department be asked to defer for the present further action in regard to the recommendations recently submitted by the Council of Agriculture respecting standards for apples.

3. *Railways Rates for Fertilisers—*

That the report made orally at this meeting by Mr. J. W. Davidson to the effect that a reduction of 25 per cent. will be made in the Queensland rates for distances over 200 miles, but not less than the present rate for 200 miles, be noted with an expression of the Council's appreciation of the action taken by the Railway Department in this matter.

4. *Railway Freight on Fruit Consignments.*

That the communication dated the 14th August, 1922, from the Secretary to the Commissioner for Railways be referred to the Fruit Committee for their information.

5. *Banana Pool Ballot—*

That the Under Secretary, Department of Agriculture and Stock, be advised that in view of the circumstances mentioned in Mr. Ross's memorandum of the 17th August, 1922, the Council concurs in the suggestion that a further ballot should be taken as indicated in the memorandum.

6. *Designation of Organisers—*

That it be a recommendation that the designation "Provisional Organiser" be changed to "District Agent."

7. *Appointment of Mr. Allan McKinlay—*

That Mr. Allan McKinlay be appointed as District Agent for District No. 13A, in the room of Mr. Harris, resigned.

8. *Bad Roads, Woombye District—*

- (a) That a copy of the particulars received by the Chairman of the Administrative Committee from the Chairman, Main Roads Board, be sent to the Secretary, Local Producers' Association, Woombye.
- (b) That a copy of the particulars received from the Local Producers' Association, of Woombye, in regard to the above matter, together with a copy of the details furnished by the Chairman of the Main Roads Board, be sent on to the Under Secretary, Home Department, for consideration in connection with any amendment of the Local Authorities Act which that department may have in contemplation.
- (c) That the "Weight of Load" Regulations under the Main Roads Act be brought under the notice of the Transport Committee for consideration and recommendation to the Council in regard to any amendment which, in the opinion of the Committee, should be made in the Regulations in question.

9. *Telephone Service—*

That in regard to the application made to the Deputy Postmaster-General for the connection of the offices of the Council of Agriculture with the Central Telephone Exchange, the Deputy Postmaster-General be again communicated with and asked that, having regard to the public importance of the work which is being undertaken by the Council and to the difficulties which are being experienced in not having a telephone installed, he will be so good as to arrange to treat the application as urgent and to have the telephone installed as soon as the first line is available.

10. *Labour for Cotton Picking—*

- (a) That the correspondence which has taken place between the Chairman of the Administrative Committee and the Director of Labour in regard to the above matter be noted.
- (b) That a copy of the letter dated the 14th August, 1922, received by Mr. Story from the Director of Labour, be sent to the Wondai Chamber of Commerce, with a suggestion that should the Association desire to avail itself of the services of the Department of Labour, the Association communicate direct with the Director.

11. *State Sawmills, Amiens: Case Timber—*

- (a) That the recent letter suggesting that the State Sawmill at Amiens be reopened for the purpose of cutting timber for fruit-case purposes be received and sent on to the Fruit Committee for consideration.
- (b) That a copy of the letter in question be also forwarded to the Director of Forests for the information and consideration of that Department.

12. *Primary Producers' Organisation Act—*

That the recommendations of the Administrative Committee, as contained in Schedule 1 hereto, be approved and that the necessary further action be taken thereon.

13. *Constitution of District Councils—*

- (a) That the number of District Councillors for each district be nine.
- (b) That the ballot for the election of District Councillors be conducted on a sectional basis; that is to say—
 - (i.) That the registered producers in the nineteen districts be classified according to the section of the agricultural industry in which they are engaged, namely—
 - Dairying;
 - Fruitgrowing;
 - General Agriculture;
 - Sugar-growing.
 - (ii.) That the proportion of the nine Councillors to be allocated to the particular section of the industry be determined by the registered number of producers in that section as on 30th November, 1922.

- (iii.) That in the case of ballots the producers in each section of the industry vote only for the persons nominated in that section—thus—

Dairymen shall vote only for the persons nominated for the Dairying Section;

Fruit-growers shall vote only for the persons nominated for the Fruit Section;

General Agriculturists shall vote only for the persons nominated in the General Agricultural Section; and

Sugar-growers shall vote only for the persons nominated in the Sugar Section.

- (c) That each Local Producers' Association name not later than 30th November, 1922, the place which it desires to be the headquarters of its District Council.
- (d) That in the event of more than one place being named as the headquarters of a particular District Council, a ballot of the registered producers in that district be taken to determine the headquarters; such ballot to be taken at the same time as the ballot for the District Councillors or at such other time as the Council of Agriculture may determine.

14. *Chairman, Dairying Committee—*

That it is noted that Mr. E. Graham has been elected as Chairman of the Dairying Committee.

15. *Question of Erection of a New Butter Factory at Rockhampton—*

That the report submitted by Messrs. Graham and Harris on their recent visit to Rockhampton for the purpose of attempting to bring about a reconciliation between the Directors of the Rockhampton Co-operative Company and the Provisional Directors of the Central District Co-operative Company be received, and that the particulars contained therein be noted.

16. *Pasteurisation of Milk and Cream—*

- (a) That it is noted that the Dairy Committee is strongly of opinion that the installation of pasteurisers in Queensland factories, where necessary, would effect a general improvement in the quality of butter and cheese produced.
- (b) That suitable particulars relating to this matter be embodied in the next Bulletin to be issued by the Council.
- (c) That the particulars be brought suitably under the notice of the secretaries of the Co-operative Dairy Companies and Cheese Manufacturers' Associations, and that their co-operation and assistance be invited.
- (d) That the several establishments which have kindly supplied the Committee with information respecting pasteurisers be suitably thanked and advised, at the same time, of the action taken by the Council.
- (e) That further information regarding the cost of installation of the complete pasteurising plant (cooler, pump, &c.) be obtained from A. J. Dutch, Wellington, New Zealand.

17. *Co-operative Companies Bill—*

- (a) That the report of the proceedings of the conference held to discuss suggestions for possible inclusion in the proposed Co-operative Companies Bill be received.
- (b) That the Council endorse the resolution carried by the conference regarding the appointment by the Council of a special committee to report on the matter.
- (c) That the several members of the Administrative Committee be appointed as a select committee to go thoroughly into this question with officers of the Crown Law Department.

18. *Herd Testing—*

- (a) That the Council defer action in regard to the adoption of any definite scheme until after the arrival of the Director.
- (b) That the Director confer with the Dairy Standing Committee and the Director of Dairying, with a view to the preparation of a concrete scheme to be submitted by the Council to the District Councils and Local Producers' Associations.

- (c) That such scheme embody provisions for securing the support of dairy-men, their compliance with prescribed rules and the financing of the scheme by a levy to be made and applied for the specific purpose of herd-testing in accordance with the regulations to be made under Section 14 of the Primary Producers' Organisation Act "for the expenditure of sums raised by any particular levy only in the interests of the particular industry or section of industry in which such levies were made."

19. *Complaint regarding Slaughtering Act*—

That in connection with the statements contained in a recent report received from Organiser McMaster regarding the above question, he be furnished with a copy of the particulars obtained from the Department of Agriculture and Stock as set out in the Under Secretary's letter of the 11th August, 1922.

20. *Jersey Breed at Warren State Farm*—

That in connection with the request contained in a letter received recently from the Milman Local Producers' Association, urging the establishment of a breed of Jersey cattle at Warren State Farm, the Association be suitably communicated with on the lines suggested by the Dairy Committee.

21. *Factory Returns relating to Low-Grade Cream*—

That the letter dated the 1st August, 1922, from the Department of Agriculture and Stock be received, and that in view of the circumstances mentioned therein the present system be given a further six months' trial.

22. *Dairy Inspectors and Instructors*—

- (a) That it is noted that in the Estimates for the financial year 1922-23 provision has been made for the following additional appointments, namely:—An Assistant Dairy Expert, a Dairy Instructor, a Dairy Inspector, and two Herd-testers.
- (b) That the Department of Agriculture be requested to take such action as will ensure the regular inspection of dairying premises.

23. *Facilities for Marketing of Pigs*—

- (a) That it is noted that the Dairy Committee is in accord with the principles underlying the suggestions contained in a recent letter from Mr. Wight.
- (b) That before any further action is taken in this matter the views of pig-producers be obtained as far as practicable.
- (c) That with a view to obtaining the information referred to in (b) above, the matter be brought suitably under the notice of the District Agents and the Local Producers' Associations in districts and localities where pigs are produced.

24. *Question of Regrading of Australian Butter, &c.*—

That in connection with the Resolutions submitted by the Canaga Local Producers' Association regarding—

- (a) The regrading, standardising, and branding of Australian butter at place of import;
- (b) The overcoming of competitive antagonism in the marketing of Australian butter overseas; and
- (c) The standardising of first-class butter by Government experts;

the Association be informed that (a) and (c) are matters for determination by the Commonwealth Government as a result of the recent agreement arrived at between the Commonwealth and the States; and that though in accord with the principle underlying (b) the Committee is not in a position at present to take any further action.

25. *Stabilisation of Prices*.—

- (a) That the information contained in a wire dated 15th August, 1922, received from Mr. Owens (Commonwealth Dairy Pool), regarding the present position in Victoria, is noted with satisfaction.
- (b) That the matter be brought up again for discussion on receipt of the further particulars promised by Mr. Owens.

26. *Improving Cultural Methods of Wheat Growing—*

That it is noted that in accordance with the proposals contained in the report submitted to the Council in May last, the whole of the stocks of selected wheats held by the Department of Agriculture were acquired by the Wheat Board and disposed of to growers upon specified conditions; and that reports to hand show that germination has been good.

27. *Maize Pool—*

- (a) That the Department of Agriculture be requested to furnish as soon as possible, for the information of the Council, particulars in regard to the result of the ballot taken recently by the Department in regard to a Maize Pool.
- (b) That the Director be requested to obtain, while in Victoria, such particulars as he may be able to secure in regard to the manufacture (by the Maize Products Company at Footscray, Victoria) of glucose, starch, and other by-products of maize.

28. *Wheat Board Election—*

- (a) That it is noted that in the opinion of the Wheat and General Agriculture Committee it is desirable that the tenure of office of the members of the Wheat Board to be elected in November next should be two years.
- (b) That the Department of Agriculture be advised accordingly.

29. *Export of Eggs—*

- (a) That the recent letter from the Department of Agriculture and Stock covering copy of a communication from the Soldiers' Settlement Branch of the Lands Department, regarding the glut season for eggs and the desirability of organising an export trade, be acknowledged with an intimation that the matter is under consideration.
- (b) That the South Australian Farmers' Union be communicated with in suitable terms, with a view to the obtaining from that body details of any scheme which it may have in operation regarding this matter: a copy of the letter to be sent to Mr. Macgregor for his information and for such action as it may be conveniently possible for him to take thereon when passing through Adelaide.
- (c) That the Department of Trade and Customs be asked for:—
 - (i.) A copy of the regulations, if any, made under the Customs Act to bring about uniformity in regard to quality and size of eggs for export;
 - (ii.) Statistics in regard to eggs imported to or exported from Australia;
 - (iii.) Such further helpful particulars as the Department may be able to supply in regard to markets for eggs, egg-pulp, &c.
- (d) That the views of the Brisbane Poultry Associations be ascertained generally on the question of promoting an export trade for eggs.

30. *Fertilisers—*

- (a) That the letter dated the 8th August, 1922, from the Commissioner of Prices be received, and that the further consideration thereof be deferred pending action by the Commissioner as indicated in the concluding paragraph of his letter.
- (b) That in the meantime the Agricultural Chemist be requested (through the Under Secretary, Department of Agriculture and Stock) to explain the method of determining the unit value of fertilisers and the most suitable means to be employed in disseminating the information to growers.
- (c) That the Department of Agriculture be asked for full information in regard to the present system of testing fertilisers.

31. *Agricultural Machinery—*

- (a) That inquiry be made from the South Australian Farmers' Union as to the system employed by them in regard to the indenting of agricultural machinery and the sale thereof to the individual farmers; a copy of this letter to be sent to Mr. Macgregor for his information and for such action as it may be conveniently possible for him to take thereon when passing through Adelaide.
- (b) That inquiries be made also from New Zealand and Southern manufacturing firms respecting this matter.
- (c) That the further consideration of the matter be then deferred until the Director arrives and he can be consulted thereon.

32. *African Maize—*

- (a) That the wire dated the 11th August, 1922, from the Secretary, Local Producers' Association, at Atherton, asking the Council to urge the Minister for Customs to arrange for an immediate increase of three shillings cental duty on African maize, be received and transmitted to the Tariff Board, Melbourne, with an intimation that it is the opinion of this Council that, as Australia can produce sufficient maize under normal conditions for all Australian requirements, the request should be favourably considered.
- (b) That inquiry be made at the same time as to the steps, if any, already taken by the Board in the matter.

33. *Question of Protection for Coffee-growers—*

- (a) That the letter dated the 15th August, 1922, from the Secretary, Buderim Progress Association, intimating that unless some further protection is given to Queensland coffee-growers the industry must die out owing to the small prices obtainable at present for this commodity, be acknowledged with an intimation that inquiries are being made into the matter; the Secretary to be requested at the same time to furnish particulars as to the quantity of coffee produced at present by the growers to whom he refers.
- (b) That a copy of the letter referred to above be sent to the Tariff Board, Melbourne; and that the Board be requested to furnish particulars as to—
 - (i.) The duty, if any, on coffee imported to Australia;
 - (ii.) The annual quantity produced in Australia at present;
 - (iii.) The annual consumption at present.
- (c) That a copy of the letter be sent also to the Federal Member for the Lilley Division (*i.e.*, the Federal Electoral Division comprising the area mentioned in (a) above).

34. *Scheme for Improving Horses, &c.—*

- (a) That the letter from the Under Secretary, Department of Agriculture and Stock, covering a scheme for the improvement of types of horses in Queensland, be received and acknowledged with an intimation that in the opinion of this Council all possible measures should be taken to produce good types of reliable horses suitable not only for use in Queensland but also for export to other countries.
- (b) That this Council is also of opinion that a stallion tax should be imposed, and that the inspection and approval of mares is also desirable.

35. *Co-operative Purchasing of Stallions, Bulls, &c. —*

That the Council urge the Government to encourage and to assist as far as practicable in the co-operative purchasing, where necessary, of approved stallions, bulls (beef and dairy), rams, and boars.

36. *Minimum Load of Butter in Iced Wagons—*

That the following circumstances be noted:—

- (a) The butter wagons which are capable of carrying up to 8 tons of butter are hauled to the factories empty; and a reduction of the minimum load from 3 to 2 tons would mean haulage of very lightly loaded vehicles;
- (b) That there should be no difficulty in forwarding small loads of butter in louvered wagons during the winter, and that during the summer months, as factories are usually able to make up a minimum load of 3 tons, no serious difficulty should be experienced except, perhaps, in drought time, when the circumstances could be brought up for further consideration.

37. *Question of Motor Road Transport, Remote Localities—*

That it is noted that in the opinion of the Transport Committee this matter (arising out of a communication from Mr. C. H. Annesley, Cunnewin, *viâ* Roma, in which he intimates that he would be prepared to establish a motor transport service in any remote locality offering fair prospects of building up a successful business) is not one for its attention.

38. *Preferential Rates—Rural Industrial—*

That in connection with the reference from the Woombye Local Producers' Association:—

“To foster the establishment of rural industries, differential rates in favour of manufactured articles sent to port should be granted on the railways, and also the necessary essential requirements, such as tinned plate, sugar, cases, &c.,”

it is noted that the Transport Committee is of the opinion that this request has apparently been made without a full knowledge of the fact that jam, jellies, marmalade, preserved fruits, and fruit-pulp all obtain special low rates to port, and that sugar to jam factories, case timber, and tinplate, “B” class, are also chargeable at special cheap rates.

THE PRIMARY PRODUCERS' ORGANISATION ACT.

ITS PROVISIONS REVIEWED.

By “*The Primary Producers' Organisation Act of 1922*” the Queensland Producers' Association, made up of the Council of Agriculture, District Councils, and Local Producers' Associations, is now statutorily established, and its functions, powers, authorities, duties, and responsibilities are fully set out by parliamentary authority.

Council of Agriculture.

The Council of Agriculture, which is really the executive body of the Queensland Producers' Association, is now incorporated and has been constituted as follows:—

- (a) The number of members of the Council shall be the number from time to time declared by the Governor in Council by Order in Council, but shall not exceed twenty-five at any one time.
- (b) Not less than five members nor more than one-fourth of the total number of members shall be appointed by the Governor in Council as the representatives of the Government.

The Minister shall by virtue of his office be a member of the Council and shall be deemed to have been appointed by the Governor in Council as one of the said representatives of the Government.

- (c) The remaining members, of whom there shall be not less than fifteen, shall be elected by the district councils.

Each district council shall elect one member in the prescribed manner to be the representative of such district council.

- (d) All such representatives (other than the Minister) shall hold office only for a term declared by the Governor in Council by Order in Council, but not exceeding three years, and shall be eligible for reappointment or re-election, as the case may be.
- (e) Any person who has his affairs under liquidation, or is an uncertificated or undischarged insolvent, or has been convicted of an indictable offence, or is undergoing a sentence of imprisonment, or becomes an insane person, shall be disqualified from being appointed or elected or from continuing a member of the Council.

The First President.

The Minister for Agriculture shall, by virtue of his office, be the President of the Council. The Hon. W. N. Gillies is, therefore, the first President of the Queensland Producers' Association.

Vacancies.

Full provision has been made for filling vacancies on the Council in the most democratic way possible. The appointment of a Director and a capable staff has also been provided for.

Functions and Objects of the Council.

The functions and objects of the Council shall be to co-operate with the Department, district councils, local associations, and other bodies and persons in—

- (i.) Developing the rural industries;
- (ii.) Effecting the stabilisation of prices of primary produce for the purpose of ensuring to the primary producer a fair remuneration for his labour;
- (iii.) Investigating and dealing with problems relating to the rural industries including animal husbandry;
- (iv.) Advising and instructing primary producers with regard to matters which require scientific knowledge and training, farm management and farm economics, including cost of production and farm accountancy;
- (v.) Making research on subjects pertaining to the rural industries;
- (vi.) Securing effective action for the controlling of diseases and pests generally;
- (vii.) Securing additional markets for the disposal of produce and improved means of distribution;
- (viii.) Studying markets; accumulating data regarding marketing processes and costs; disseminating accurate market information; and eliminating waste and unnecessary marketing expenses;
- (ix.) Securing improved means of storage, handling, and transport;
- (x.) Promoting a general policy of testing, standardising, and grading;
- (xi.) Extending the usefulness of the professional staff of the Department by the utilisation of experts, the dissemination of literature and pamphlets dealing with matters of interest to primary producers, and by any other method which the Council thinks fit, including the establishment of a Bureau of Information for primary producers;
- (xii.) Encouraging and assisting in the promotion of farmers' co-operative associations and enterprises;
- (xiii.) Bettering the conditions of rural life and the extending rural education by co-operation with the educational authorities of the State and generally;
- (xiv.) Dealing with matters in relating to agriculture and production of primary produce which may be referred to the Council by the Minister;
- (xv.) Generally advising, assisting, and co-operating with the Department and the Associations in all matters pertaining to the rural industries; where deemed necessary, convening conferences;
- (xvi.) Making research on the subject of the utilisation of rural products in manufactories; co-ordinating and assisting in the promotion of such industries by the extension of the Bureau of Information, and, where necessary, convening conferences for this purpose.

The Provisional Council.

The Provisional Council of Agriculture appointed by the Governor in Council, now in existence, is deemed to have been constituted as the Council of Agriculture under the Act, and its members shall hold office until the appointment or election of a Council of Agriculture in the manner prescribed, but in no case shall any member of the Council or any provisional district council continue in office after the 24th March, 1923.

District Councils.

For the purposes of efficient organisation, provision is made for the establishment of Districts within defined boundaries.

For each District a district council shall be constituted, the members of which shall be elected by members of local producers' associations for a term not longer than three years.

Duties and Functions of a District Council.

The duties and functions of a district council shall be—

- (i.) To secure co-operation as far as possible amongst the primary producers who are members of local associations assigned to the District;
- (ii.) To advise and assist the Council in developing schemes in regard to the production, marketing, grading, and standardisation of primary produce, or for making more effective use of the experts and facilities of the Department;
- (iii.) To advise and assist the Council in such matters as co-operation in the purchasing of machinery, fertilisers, and other articles employed in primary production, promotion of herd-testing, fodder conservation, and the circulation among primary producers of information and advice on primary production generally; and
- (iv.) Such other duties and functions as the Council may determine.

The Council of Agriculture may assist, monetarily, district councils by grants from the Fund for the creation of which statutory authority is given.

Local Producers' Associations.

Where at least fifteen primary producers in any centre desire it and make the prescribed application to the Council of Agriculture, a local producers' association may be formed. Every man obtaining his living directly from the soil is entitled to enrolment in a local association, but he may only belong to one such body, and may not become a member of two or more local associations.

Duties and Functions of Local Producers' Associations.

The duties and functions of local associations include—

- (i.) Taking the initiative in rural matters pertaining to the particular locality in which the associations primarily interested;
- (ii.) Ascertaining the requirements of such locality and formulating schemes for having these requirements met;
- (iii.) Bringing before the district council, through the local association's representative, requirements and problems which are not of purely local concern, but are of common interest and concern;
- (iv.) Advising, supporting, and assisting the district council in its efforts to promote the general prosperity of the primary producers;
- (v.) Generally co-operating with, advising, and assisting the district council in enabling it to discharge its duties and functions efficiently;
- (vi.) Endeavouring to co-ordinate and correlate the work of the local associations, progress associations, and other like societies in the District, and to strengthen the work they are doing in so far as it relates to the rural industries.

Queensland Producers' Association Fund.

The Act makes provision for the establishment of the Queensland Producers' Association Fund, to which will be charged all expenses incurred by the Council in carrying out its functions. The Council will administer this Fund, which will be subject to regular audit by officers of the Department of the Auditor-General.

All levies made by the Council as prescribed, and all fines for non-payment, shall be paid into the Fund.

During a period of five years from the date of the passing of the Act, the Governor in Council shall make grants in aid of the Fund out of Parliamentary appropriations for that purpose, and every such grant shall be at a rate of not less than £1 for every £1 paid into the Fund during the twelve months preceding such grant in respect of all levies and fines imposed under the Act.

Regulations for the control and management of the Fund are set out in the Act.

Levies.

The Act provides that before any levy is made on the primary producers in any industry, at the request in writing of at least one hundred primary producers in that industry a poll of such primary producers shall be held, and if upon such poll the majority of votes is against the making of such levy, no such levy shall be made upon the primary producers in that industry.

Rules Governing Proceedings.

Rules governing proceedings and business of the Council of Agriculture, district councils, and local producers' associations are set out fully in the Schedule of the Act.

What is a Primary Producer?

The definition of the term "primary producer" is set out clearly in the Act as follows:—

"Primary producer"—Every person, not being a person engaged in primary production as an employee on wages or piecework rates, engaged in the occupation of—

- (a) Dairy farmer; or
- (b) Wheat maize or cereal grower; or
- (c) Cane-grower; or
- (d) Fruit-grower; or
- (e) Grazier; or
- (f) Farmer, whether engaged in general or mixed farming, cotton potato or vegetable growing, or poultry or pig-raising; and

any class of persons, not being persons engaged in primary production as employees on wages or piecework rates, declared by the Governor in Council, on the recommendation of the Council, by Order in Council, to be primary producers for the purposes of this Act; and "primary produce" and "primary production" have correlative meanings.

BURNETT CANE CROP PROSPECTS.

Reporting on the cane crops in the Bundaberg, Isis, and Maryborough sugar areas, the Director of Sugar Experiment Stations, who recently returned from a brief visit to these places, said that although the cane was backward, due to the long spell of dry weather during the autumn months, the recent good falls of rain in July had much improved the prospects, with the exception of the standover cane, and the mills are now expecting to harvest more cane than was estimated six weeks ago. Some frosts have occurred, but these have done no serious damage, and if the remainder of the winter is mild and further rains fall there is plenty of time during the crushing season for the crops to still further improve. The sugar content in the cane is very fair to good at present, and farmers generally are well satisfied. The mills are working smoothly and the improvements made during the slack season are giving good results. The Isis Central mill has been brought up to date by the installation of a new 10-ton pan, a large extra effert, a fine spray system in place of the old water tower, new Edwards dry-air pump of special design, new duplex reciprocal pump, and centrifugal pumps. These improvements have been made under the supervision of the manager, Mr. J. Alison. Doolbi mill has also had new machinery installed, and a number of ingenious automatic devices at various stations are saving labour and regulating deliveries. These are principally the invention of the manager, Mr. G. Francis, who was assisted in some particulars by the mill overseer, Mr. G. Stevenson. The three mills in the district expect to treat about 170,000 tons of cane, and it is anticipated that another 30,000 tons will go to Fairymead.

The cane about Maryborough has also improved, though there is not so much grown now as there should be.

The cane at the Sugar Experiment Station, Bundaberg, was looking well. One of the more-recently introduced varieties, known as E.K.1, from Java, is of great promise. So far it has proved a fine ratooner and a good standover cane. Its commercial sugar content is good also, and it is attracting much attention from visiting farmers.

Editorial Notes.

Co-operative Butter Selling.

Variations in angles of sight of the directorate of one of our leading co-operative dairy companies in respect to co-operative selling, as expressed at a recent meeting, will not discourage the student of co-operative development. The conditions that must prevail and the fundamental principles essential for acceptance before any co-operative marketing system that is likely to endure can be established were not discussed at the meeting referred to, yet their consideration was important to its purpose and much needed, for the divergent viewpoints are rooted in them. Farmers in every country, when they first resort to co-operative methods of marketing, usually have to meet with bitter and often unscrupulous opposition from the interests that previously handled their produce. In the face of such opposition no amount of devoted effort or unstinted thought will bring success to co-operation unless the previous conditions were such as to present striking evidence of the benefits to be derived from combined, regulated, and forcefully directed effort. Hence we have a well-established principle in co-operative marketing that, unless at the time of organisation conditions are so satisfactory that immediate benefits are assured early in the life of the co-operative organisation, the concern is likely to suffer from inertia or succumb to attacks from outside interests. Experience teaches that co-operative marketing can only be readily established when conditions are such that the need of improvement is generally apparent to those engaged as producers in the industry affected. When they are otherwise, the well-meant efforts of promoters are more likely to hinder than to help the industry concerned. When prices are below cost and farmers are actually paying money in addition to their commodity for the privilege of marketing their output, co-operative selling can be readily incepted. Not until vignerons fed raisins to their horses were the fruitgrowers of California ready to organise the selling end of their business.

The principle that selling organisations must be composed of persons whose interests are similar is generally accepted by co-operators; and experience has shown that membership of sales organisations should usually be limited to actual producers. All attempts hitherto made to combine in one organisation the interests of producers and dealers or packers have demonstrated the incompatibility of such an arrangement. Many instances of their failure might be quoted. Combinations of this character for a while look as though they were the solution of every marketing problem. Success may be apparent for a time, yet, as a rule, the life of every such hybrid agency is brief and fitful. Conflicting interests and the grievances and jealousies they engender are usually the disintegrating causes. The outstanding factor of all success in co-operative effort is the loyalty of individual members. Other of the main contributing quantities are mutual confidence, sound economics, a common-sense knowledge of human nature, and fair dealing. All these elements are absolutely essential to the permanent success of co-operative enterprise, especially in a marketing organisation.

Underlying the clash of ideas at the meeting referred to, the will and determination to co-operate completely were evident, and in revealing this a big service to the dairying industry was done. And the meeting did even more, by focussing thought on its selling difficulties and clearing the ground for the extension of its co-operative enterprise. The difficulties expressed and appraised are not new. In other countries they have been encountered and overcome, and at this juncture it is a wise thing to survey, and, if possible, profit by the experience of co-operators in either Denmark or Germany.

In the countries named fully 90 per cent. of all dairies are attached to central organisations, which serve their common as distinct from their particular business objects. Such bodies are called unions, the main purpose of which is to undertake the audit and inspection of their affiliated societies. Besides this, they act in general as intelligent organisers and regulators of co-operative effort. These unions possess no purely business functions; their legal status is that of a registered association, which implies that they do not carry on any profit-making business. Membership does not involve any liability. Apart from audit and inspection, these unions undertake propaganda and advisory work. Their articles expressly state that the independence, internal economy, and administration of their affiliated societies shall in no way be interfered with as the result of their association in the union. Over 90 per cent. of dairies in Germany are audited by auditors appointed by these unions. This examination is not merely an accountancy audit, but rather a general audit and inspection of all the circumstances of a dairy. Experience favours audit by unions, for the specialists appointed are professional co-operators whose interests and lifework are linked with co-operation, and who are concerned in the lifting of the level of good management. With our dairy companies linked up in an audit union the reports of its auditors would furnish convincing evidence on commercial matters, as is evident from the proceedings of the meeting referred to, now receiving the close attention of co-operators, and should prove a satisfactory means of eliciting the data needed for influencing sound and timely business decisions.

Event and Comment.

The Cotton Guarantee.

In the course of his Budget Speech, the Treasurer (Hon. E. G. Theodore) made the following statement on the subject of the guarantee to cotton-growers:—

“Already cotton-growing has been greatly stimulated in this State by the action of the Government in guaranteeing to the growers 5½d. per lb. for all seed cotton of approved quality grown by them. This guarantee was for three years ending 30th June, 1923. In order to still further encourage the planting of cotton, the Government has decided to extend the existing guarantee until 31st July, 1923—that is, by one month—to enable the cotton-growers to reap the advantage of the guaranteed price of 5½d. per lb. for the whole of the forthcoming crop, which ought to be harvested by the extended date. It is intended also to guarantee a price for a further period of three years ending 31st July, 1926. The conditions under the new guarantee will be different to those ruling at present, as the price will be based on the quality and length of staple of the cotton. The details have not yet been worked out, but for the first year of the new guarantee period the maximum price will be 5½d. per lb. for seed cotton of one and a-quarter inch staple, of good quality and free from disease. In 1920 the Government entered into an agreement with the British Cotton Growers' Association (a body mainly comprising Lancashire cotton manufacturers), under which the Association guaranteed for cotton grown in Queensland the price of 1s. 6d. per lb. of clean lint of good quality, c.i.f. Liverpool. The agreement was for five years, but the Association's losses were limited to £10,000. The prices realised for Queensland cotton during 1921 were below the price guaranteed under the agreement, and it will, therefore, be necessary to draw upon the guarantee. Any balance of the £10,000 will be applicable to the 1922 crops, but any loss beyond the amount of the guarantee must be borne by the Queensland Government.”

The Boll-Worm Menace to Queensland Cotton.

“I must emphasise the absolute need for the taking of every precaution to prevent the advent of the boll-worm in our cotton fields,” remarked the Minister for Agriculture and Stock (Hon. W. N. Gillies) in the course of a recent Press interview. Mr. Gillies was speaking on the representations respecting this pest made by the Queensland Government to the Commonwealth authorities, to the Tariff Commissioner, and to the Director-General of Public Health. “The matter,” he said, “was discussed with the Tariff Commission by Messrs. Crawford Vaughan, D. Jones, and the Under Secretary (Mr. E. G. Scriven). Mr. Scriven also saw the Director-General of Health on the subject when recently in Melbourne, the request then made being that the carriage of seed through the post should be prohibited and that Brisbane should be made the only port of entry. Information had now reached him that all seed arriving through the Customs at any port other than Brisbane would be sent for treatment and for examination to Brisbane, where there were officers with special experience in cotton pests and diseases. America's experience with the boll-worm warranted the taking of the strictest precautions by Queensland to maintain her cotton fields free of all disease,” the Minister continued. “The latest advices showed that America this year was suffering very badly from the pest, and though the extent of the damage was not fully known, the ‘Manchester Guardian,’ of 6th July, stated, on information based upon official reports from the United States, that the situation as indicated by a recent report of a crop condition of 71.2 per cent., an acreage of 34,850,000, and a crop of 11,065,000 bales is fraught with danger. The newspaper adds that a report from Georgia asserted that in a section of that State the damage by weevil was 100 per cent., and that a prominent farmer in Texas had computed the presence of the weevil upon his farm at the rate of 5,000 to the acre.

“This knowledge gave additional emphasis to the need for preventing the introduction of seed from America or any other source similarly affected, unless under the most stringent conditions of treatment. The interest in cotton cultivation in Australia was not confined to Queensland, but the residents of the Southern States had not had the experience of Queensland growers, and therein rested the danger—the possibility of affected seed being admitted at southern ports where those interested in the examination at the time of entry had not the knowledge and experience of the pests of cotton as are possessed by the Queensland Government Entomologists (Mr. H. Tryon). There had also existed the danger of seed being carried through the post, and only lately it was necessary to search for a parcel that had passed through the post without being noticed. Fortunately the seed was found before it was planted. It was now in quarantine.”

General Notes.

TO CORRESPONDENTS.

To avoid delay in answering a number of questions on agricultural and kindred subjects, replies have been sent by post. The replies of general interest to farmers will be published in the Journal in due course.

CASSABA MELON SEEDS.

A number of requests have been received for cassaba seeds. As only last season's seeds are now on hand, we should like some grower who benefited by last year's distribution and who retained seed from the resultant crop for this year's sowing, to kindly supply a small parcel to enable us to meet these requests with new seed.

Farm and Garden Notes for October.

FIELD.—With the advent of warmer weather and the consequent increase in the soil temperature, weeds will make great headway if not checked; therefore our advice for last month holds goods with even greater force for the coming month. Earth up any crops which may require it, and keep the soil loose among them. Sow maize, sorghum, setaria, imphee, panicum, pumpkins, melons, cucumbers, marrows. Plant sweet potatoes, yams, peanuts, arrowroot, tumeric, chicory, and ginger. Coffee plants may be planted out. There are voluminous articles in previous journals giving full instructions how to manage coffee plants, from preparing the ground to harvesting the crop, to which our readers are referred.

KITCHEN GARDEN.—Our notes for this month will not vary much from those for September. Sowings may be made of most vegetables. We would not, however, advise the sowing of cauliflowers, as the hot season fast approaching will have a bad effect on their flowering. French beans, including butter beans, may be sown in all parts of the State. Lima and Madagascar beans should also be sown. Sow the dwarf Lima beans in rows 3 ft. apart with 18 in. between the plants. The kitchen garden should be deeply dug, and the soil reduced to a fine tilth. Give the plants plenty of room, both in sowing and transplanting, otherwise the plants will be drawn and worthless. Thin out melon and cucumber plants. Spraying for fungoid diseases should be attended to, particularly all members of the *Cucurbitaceæ* and *Solanum* families, of which melons and tomatoes are representative examples. Give plenty of water and mulch tomato plants planted out last month. Asparagus beds will require plentiful watering and a good top-dressing of short manure. See our instructions in "Market Gardening," obtainable on application to the Under Secretary, Department of Agriculture and Stock. Rosella seeds may be sown this month. No farm should be without rosellas. They are easily grown, they bear heavily, they make an excellent preserve, and are infinitely preferable to the mulberry for puddings. The bark supplies a splendid tough fibre for tying up plants. The fruit also makes a delicious wine.

FLOWER GARDEN.—The flower garden will now be showing the result of the care bestowed upon it during the past two months. The principal work to be done this month is the raking and stirring of the beds, staking, shading, and watering. Annuals may be sown as directed for last month. Plant tuberose, crinum, ismene, amaryllis, panceratium, hermocallis, hippeastrum, dahlias, &c. Water seedlings well after planting, and shade for a few days. Roses should now be in full bloom. Keep free from aphids, and cut off all spent flowers. Get the lawn-mower out and keep the grass down. Hoe the borders well, and trim the grass edges.

Orchard Notes for October.

THE COAST DISTRICTS.

October is frequently a dry month over the greater part of Queensland, consequently the advice that has been given in the notes for August and September regarding the necessity of thorough cultivation to retain moisture is again emphasised, as, unless there is an adequate supply of moisture in the soil to meet the trees' requirements, the coming season's crop will be jeopardised, as the young fruit will fail to set.

Thorough cultivation of all orchards, vineyards, and plantations is therefore imperative if the weather is dry, as the soil must be kept in a state of perfect tilth, and no weeds of any kind must be allowed to grow, as they only act as pumps to draw out the moisture from the soil that is required by the trees or fruit-yielding plants. Should the trees show the slightest sign of the want of moisture, they should be given a thorough irrigation if there is any available means of doing so, as it is unwise to allow any fruit trees to suffer for want of water if there is a possibility of their being supplied with same. Intermittent growth, resulting from the tree or plant being well supplied with moisture at one time and starved at another, results in serious damage, as the vitality is lessened and the tree or plant is not so well able to ward off disease. A strong, healthy, vigorous tree is frequently able to resist disease, whereas when it has become debilitated through neglect, lack of moisture or plant food, it becomes an easy prey to many pests. If an irrigation is given, see that it is a good one and that the ground is soaked; a mere surface watering is often more or less injurious, as it is apt to encourage a false growth which will not last, and also to bring the feeding roots to the surface, where they are not required, as they only die out with a dry spell and are in the way of cultivation. Irrigation should always be followed by cultivation, so as to prevent surface evaporation and thus retain the moisture in the soil.

All newly planted trees should be carefully attended to, and if they show the slightest sign of scale insects or other pests they should receive attention at once. All growth not necessary to form the future tree should be removed, such as any growths on the main stem or main branches that are not required, as if this is done now it will not only save work later on, but will tend to throw the whole strength of the tree into the production of those limbs that will form the permanent framework of the tree. In older trees all water sprouts or other similar unnecessary growths should be removed.

Keep a good lookout for scales hatching out, and treat them before they have become firmly established and are coated with their protective covering as they are very easily killed in their early stages, and consequently much weaker sprays can be used. The best remedies to use for young scales hatching out are those that kill the insects by coming in contact with them, such as miscible oils, which can be applied at a strength of 1 part of oil in 40 parts of spraying material and will do more good than a winter spray of double the strength. In the use of miscible oils or kerosene emulsion, always follow the directions given for the use of these spraying materials, and never apply them to evergreen trees when they are showing signs of distress resulting from a lack of moisture in the soil, as they are then likely to injure the tree, whereas if the tree is in vigorous growth they will do no harm whatever.

All leaf-eating insects should be kept in check by the use of an arsenate of lead spray, taking care to apply it as soon as the damage appears, and not to wait till the crop is ruined. Crops, such as all kinds of cucurbitaceous plants, tomatoes, and potatoes are often seriously injured by these insects, and the loss occasioned thereby can be prevented by spraying in time. In the case of tomatoes and potatoes, a

combined spray of Bordeaux or Burgundy mixture and arsenate of lead should be used, as it will serve the dual purpose of destroying leaf-eating insects and of protecting the plants from the attack of Irish blight.

Grape vines require careful attention, and, if not already sprayed with Bordeaux mixture, no time should be lost in applying this material, as the only reliable method of checking such diseases as anthracnose or black spot and downy mildew is to protect the wood and foliage from the attack of these diseases by providing a spray covering that will destroy any spores that may come in contact with them. The planting of bananas and pineapples can be continued during this month. See that the land is properly prepared and that good healthy suckers only are used. Keep the plantations well worked, and allow no weed growth. Keep a very careful lookout for fruit flies; destroy every mature insect you can, and gather and destroy every fallen fruit. If this is done systematically by all growers early in the season, the subsequent crops of flies will be very materially decreased. See that all fruit sent to market during the month is carefully handled, properly graded, and well packed—not topped, but that the sample right through the case or lot is the same as that of the exposed surface.

THE GRANITE BELT, SOUTHERN AND CENTRAL TABLELANDS.

Much of the matter contained under the heading of “The Coast Districts” applies equally to these parts of the State, as on the spring treatment that the orchard and vineyard receives the succeeding crop of fruit is very largely dependent. All orchards and vineyards must be kept in a state of perfect tilth, and no weed growth of any kind should be allowed. In the Western districts, irrigation should be given whenever necessary, but growers should not depend on irrigation alone, but should combine it with the thorough cultivation of the land so as to form and keep a fine soil mulch that will prevent surface evaporation.

All newly planted trees should be carefully looked after and only permitted to grow the branches required to form the future tree. All others should be removed as soon as they make their appearance. If there is any sign of woolly aphis, peach aphis, or scale insects, or of any fungus diseases on the young trees, these diseases should be dealt with at once by the use of such remedies as black leaf forty, Bordeaux mixture, or a weak oil emulsion. In older trees, similar pests should be systematically fought, as if kept in check at the beginning of the season the crop of fruit will not suffer to any appreciable extent. Where brown rot has been present in previous years, two or more sprayings with Bordeaux mixture can be tried, as they will tend to check other fungus growths, but at the same time the sodium or potassium sulphide sprays are more effectual for this particular disease and should be used in preference when the fruit is nearly full grown. All pear, apple, and quince trees should be sprayed with arsenate of lead—first when the blossom is falling, and at intervals of about three weeks. Spraying for codling moth is compulsory in the fruit district of Stanthorpe, and wherever pomaceous fruits are grown it must be attended to if this insect is to be kept in check.

In the warmer parts a careful watch should be kept for any appearance of the fruit fly, and, should it be found, every effort should be made to trap the mature insect and to gather and destroy any affected fruit. If this is done, there is a good chance of saving the earlier ripening summer fruits, if not the bulk of the crop. Tomato and potato crops will require spraying with Bordeaux mixture, as also will grape vines. Keep a very strict watch on all grape vines, and, if they have not already been treated, don't delay a day in spraying if any sign of an oil spot, the first indication of downy mildew, appears on the top surface of the leaf. Spraying with Bordeaux mixture at once, and following the first spraying up with subsequent sprayings, if necessary, will save the crop, but if this is not done and the season is favourable for the development of the particular fungus causing this disease, growers can rest assured that their grape crop won't take long to harvest.

Where new vineyards have been planted, spraying is also very necessary, as if this is not done the young leaves and growth are apt to be so badly affected that the plant dies.

ASTRONOMICAL DATA FOR QUEENSLAND.

TIMES COMPUTED BY D. EGLINTON, F.R.A.S.

TIMES OF SUNRISE AND SUNSET.

AT WARWICK.

1922.	JULY.		AUGUST.		SEPTEMBER	
	Rises.	Sets.	Rises.	Sets.	Rises.	Sets.
1	6.45	5.6	6.36	5.20	6.7	5.37
2	6.45	5.6	6.35	5.21	6.6	5.38
3	6.45	5.7	6.35	5.21	6.5	5.38
4	6.45	5.7	6.34	5.22	6.4	5.38
5	6.45	5.8	6.33	5.23	6.3	5.39
6	6.45	5.8	6.32	5.24	6.2	5.39
7	6.45	5.9	6.31	5.24	6.1	5.40
8	6.45	5.9	6.30	5.25	6.0	5.40
9	6.44	5.10	6.29	5.26	5.58	5.41
10	6.44	5.10	6.28	5.27	5.57	5.41
11	6.44	5.10	6.28	5.28	5.56	5.42
12	6.44	5.11	6.27	5.28	5.55	5.42
13	6.43	5.11	6.26	5.29	5.53	5.43
14	6.43	5.12	6.25	5.29	5.52	5.44
15	6.43	5.12	6.24	5.30	5.51	5.45
16	6.42	5.13	6.23	5.30	5.50	5.45
17	6.42	5.13	6.22	5.31	5.49	5.46
18	6.42	5.14	6.21	5.31	5.48	5.46
19	6.41	5.14	6.21	5.32	5.47	5.46
20	6.41	5.15	6.20	5.32	5.46	5.46
21	6.41	5.15	6.19	5.32	5.44	5.46
22	6.40	5.16	6.18	5.33	5.43	5.47
23	6.40	5.16	6.17	5.33	5.42	5.47
24	6.39	5.17	6.16	5.34	5.41	5.47
25	6.39	5.17	6.15	5.34	5.40	5.48
26	6.38	5.18	6.14	5.35	5.39	5.48
27	6.38	5.18	6.13	5.35	5.38	5.49
28	6.37	5.19	6.12	5.36	5.37	5.49
29	6.37	5.19	6.11	5.36	5.36	5.50
30	6.36	5.20	6.10	5.37	5.35	5.50
31	6.36	5.20	6.9	5.37	...	..

PHASES OF THE MOON, OCCULTATIONS, &c.

The times stated are for Queensland, New South Wales, Victoria, and Tasmania when "Summer Time" is not used.

		H. M.
2 July	(First Quarter	8 52 a.m.
9 "	○ Full Moon	1 7 p.m.
17 "	) Last Quarter	3 11 p.m.
24 "	● New Moon	10 47 p.m.
31 "	(First Quarter	2 22 p.m.

Apogee on the 15th at 3.24 a.m.

Perigee on the 27th at 1.30 a.m.

About 8 o'clock in the evening of 29th July the apparent nearness of the Moon and the giant planet Jupiter low down in the west will form a very interesting spectacle; there will be an occultation of Jupiter about 9 o'clock.

8 Aug.	○ Full Moon	2 19 a.m.
16 "	) Last Quarter	6 46 a.m.
23 "	● New Moon	6 34 a.m.
29 "	(First Quarter	9 55 p.m.

Apogee on the 11th at 6.54 p.m.

Perigee on the 24th at 5.42 a.m.

During the evenings of 14th, 15th, and 16th August the planets Venus and Saturn will, with Eta Virginis, a second magnitude star, form an interesting group in the north-west.

6 Sept.	○ Full Moon	5 47 p.m.
14 "	) Last Quarter	8 20 p.m.
21 "	● New Moon	2 38 p.m.
28 "	(First Quarter	8 40 a.m.

Apogee on the 8th at 4.12 a.m.

Perigee on the 21st at 3.36 p.m.

About 3 o'clock on the afternoon of 30th September a pair of binoculars should afford a view of the Moon and a third magnitude star—Beta Capricorni. In the course of an hour the star may be seen in a small telescope to disappear suddenly on the eastern side of the Moon and reappear on its western side.

The planet Venus will be at its greatest height in the western sky on 15th and 16th September.

The Great Australian Solar Eclipse will occur on 21st September between a few minutes after 3 p.m. to about a quarter past 5.

For places west of Warwick and nearly in the same latitude, 28 degrees 12 minutes S., add 4 minutes for each degree of longitude. For example, at Inglewood, add 4 minutes to the times given above for Warwick; at Goondiwindi, add 8 minutes; at St. George, 14 minutes; at Cunnamulla, 25 minutes; at Thargomindah, 33 minutes; and at Oontoo, 43 minutes.

The moonlight nights for each month can best be ascertained by noticing the dates when the moon will be in the first quarter, and when full. In the latter case the moon will rise somewhat about the time the sun sets, and the moonlight then extends all through the night; when at the first quarter the moon rises somewhere about six hours before the sun sets, and it is moonlight only till about midnight. After full moon it will be later each evening before it rises, and when in the last quarter it will not generally rise till after midnight.

It must be remembered that the times referred to are only roughly approximate, as the relative positions of the sun and moon vary considerably.

[All the particulars on this page were computed for this Journal; and should not be reproduced without acknowledgment.]

Queensland

Department of Agriculture and Stock

Volume XVIII

OCTOBER, 1922



Queensland Agricultural Journal



**REGISTERED AT THE GENERAL POST OFFICE, BRISBANE,
FOR TRANSMISSION BY POST AS A NEWSPAPER.**

**Edited by
J. F. F. REID**

DIABOLO SEPARATOR

SUCCESSFUL
DAIRYMEN
PREFER THE
" DIABOLO "



TAKE A
DIABOLO
as Your Choice

Over Two Million successful Dairymen name the "DIABOLO" as their choice. They find that the perfectly balanced "Diabolo" Bowl produces more cream than any other Separator—that its accuracy and simplicity make it a sure profit earner. Very simple in construction—easy to work and keep clean—it is a perfect skimmer. Dairymen who use it get every particle of Cream their cows produce. Liberal Extended Terms Available.

DIABOLO SEPARATOR CO. LTD.

CREEK STREET ::: BRISBANE

Descriptive Booklet Posted Free on Request

DIABOLO

FOR THE SUCCESSFUL DAIRYMAN

SUDAN GRASS

"THE WONDER CROP." One of the most valuable summer-growing fodder crops for grazing purposes. Sudan is a splendid drought-resister, and is relished by all stock: green, or in the form of hay. We will be pleased to quote you first-class germinating seed.

All varieties of **SEED MAIZE** now in stock, including Yellow Horsetooth, Yellow Dent, Ninety Day, White Hickory King, Golden King, etc. All especially selected, and topped and tailed samples.

For present planting *Japanese Millet, White Panicum, Ordinary Panicum, Giant Panicum, Paspalum, Rhodes Grass, Sacca-line, Imphee, White Dutch Clover, Couch Grass, etc.* Also *Cow Peas* for green manuring purposes.

SOW NOW—*Tasmanian Branching Aster and Giant Crego Aster.* We sell in packets from 6d. each. Also in bulk.

CHAS. TAYLOR & Co.

"THE LEADING SEEDSMEN"

124-128 ROMA STREET, BRISBANE

VOL. XVIII., PART 4.]

[OCTOBER, 1922.

Registered at the General Post Office for Transmission by Post as a Newspaper.]



THE
QUEENSLAND AGRICULTURAL JOURNAL,

ISSUED BY DIRECTION OF

THE HON. THE SECRETARY FOR AGRICULTURE.

EDITED BY J. F. F. REID.

VOL. XVIII. PART 4.

OCTOBER.

By Authority:

ANTHONY JAMES CUMMING, GOVERNMENT PRINTER, BRISBANE.

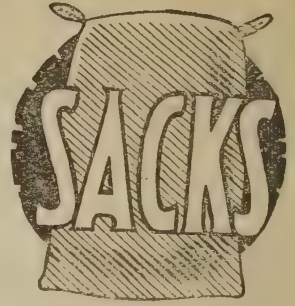
1922.

Mr. Farmer



WE

can supply any sack
or bag **you** require,
of the best quality,
at a fair price.



WE

make NEW—and stock
Reliable Second-hand.

A Trial Solicited.

JOYCE BROS. (Q.) LIMITED,
Stanley Street, South Brisbane.

As an Idea

Consider—Judge and—Act

THE PUBLIC CURATOR—

1. Is the People's Executor and Trustee ;
2. Has Trust Moneys to lend to assist Queens-landers to build or acquire homes ;
3. Makes Wills free on application ;
4. Prepares and registers real property transfers, Leases, Mortgages, Powers of Attorney and other legal documents, without the cost of Brisbane Agents ;
5. Collects Book Debts for Business Firms ;
6. Acts for Absentees as Attorney or Agent in the management of Businesses or Estates ;
7. Attests legal documents as a Notary Public or Commissioner for Affidavits of The Supreme Courts of all the States and of the Dominion of New Zealand and The High Court of Australia.

*Write for Pamphlet to the Public Curator, Brisbane, or to the
Local Deputy Public Curator at Townsville and Rockhampton.*

CONTENTS.

	Page.		Page.
Organisation of the Agricultural Industry—		Event and Comment—	
Monthly Record of Progress and Achievement	253	Agricultural Legislation	321
The Future of the Sugar Industry— (Considered by the Council of Agriculture)	258	The Primary Products Pools Bill ...	321
Grape Culture in Queensland (A. H. Benson, M.R.A.C.)	260	The Irrigation Bill—Dawson Valley Scheme	321
Fruit Fly Investigations	269	Fruit Standards and Packing	321
Some Facts of Importance Relating to Sheep Maggot Flies (T. Harvey Johnston)	272	Butter and Cheese Production ...	322
Cane Pest Combat and Control	272	The Queensland Poultry Industry ...	322
Rainfall in the Agricultural Districts ...	276	Concerted Action and Compulsory Powers—A New Zealand View ...	322
The Banana Beetle Borer—III. (J. L. Froggatt, B.Sc.)	279	Co-operation in California	323
Sugar: Field Reports	289	Standardised Canned Products—The British Market	324
New Sugar Districts	291	Co-operation and Common Honesty ...	324
Paper Mulching of Pineapples (A. T. Longley)	292	Dehydration	324
The Dairy Herd, Queensland Agricultural College, Gatton	294	Co-operation amongst Poultrymen ...	325
Report on Egg-laying Competition, Queensland Agricultural College, August, 1922	294	The Queensland Producers' Associa- tion	325
The Physiography of North Australia —II. (Dr. H. I. Jensen)	297	Acknowledgment	325
A Summary of some Experiments Carried Out by the Bureau of Sugar Experiment Stations—V.	300	General Notes—Queensland Cotton Production	326
Certificates of Soundness	307	Answers to Correspondents—	
"Bunchy Top" Disease in Bananas— Interesting Experiments	307	Paralysis in Young Pigs	328
Science Notes (E. Jarvis)	307	Lice on Pigs	328
Some Prize-winners, Royal National Show, Brisbane, 1922	312	Green Cane Top Silage	329
Editorial Notes—		Marketing Intelligence	328
Building up the Agricultural In- dustry	320	Tree Lucerne	329
		Lime-sulphur Wash	329
		To Soften Hides	330
		Coffee Berries	330
		Notice of Scrub Burns	330
		Operation of Rural Banks and Credit Systems	330
		Cassaba Melon Seeds	330
		Cotton Photograph	330
		Farm and Garden Notes for November	331
		Orchard Notes for November	332
		Astronomical Data for Queensland ...	334
		Departmental Announcements	xiii.

Queenton Seeds We Grow

Early Jewel and Ponderosa Tomato, Sugar Melon,
Giant Rock Melon, Iceberg Lettuce, Giant Rhubarb,
White Spine Cucumber, Rosella, Crested Cosmos,
Giant and Striped Zinnia, Double and Single
Dianthus, Phlox, Calendula, Sweet Peas, etc.

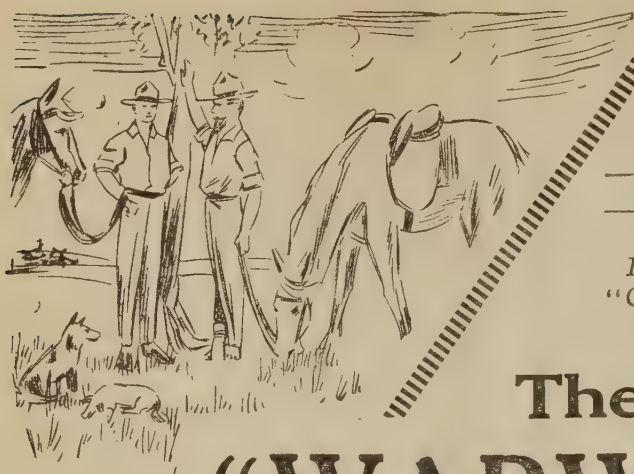
All 6d. per packet

SEED LIST ON APPLICATION

E. MANN & SON

Seed Growers

Charters Towers



—STRONG
—FEARLESS

LIKE THE ANCIENT
"COATS OF ARMOUR"

The "WARWICK"

OLIVE DRILL
WORKING
TROUSERS

(Guaranteed Fadeless)

CARRIAGE
PAID

10/6

 Pair

3 Pair for 30/-

It's a tough customer—this Olive Drill—equally as good for the man of the Saddle as it is for the Farmer. Washes and wears admirably, although it is a light and closely textured material.

Has loops for belt, cross pockets—riding or working cut—straight tops—extra strongly sewn throughout.

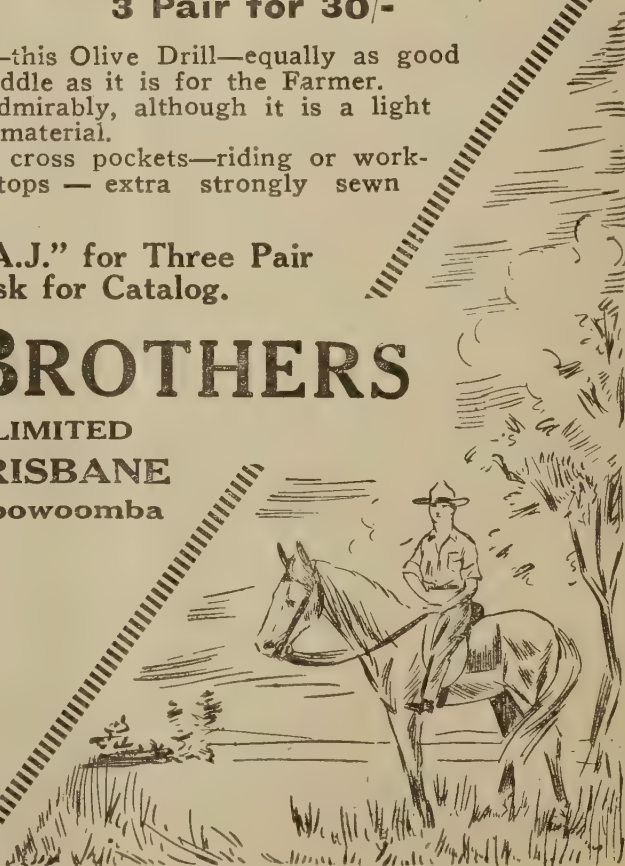
Mail to Desk "A.J." for Three Pair
To-day—Ask for Catalog.

PIKE BROTHERS

LIMITED
BRISBANE
Toowoomba

Townsville

STATE HEIGHT,
WAIST AND
INSIDE LEG
MEASUREMENT.



QUEENSLAND AGRICULTURAL JOURNAL

VOL. XVIII.

OCTOBER, 1922.

PART 4.

ORGANISATION OF THE AGRICULTURAL INDUSTRY.

The Queensland Producers' Association.

Monthly Record of Progress and Achievement.

The September Session of the Council of Agriculture was held in the Conference Room, Teachers' Training College Building, Turbot street, Brisbane, on Thursday, 21st ultimo. Subjoined is a complete record of Proceedings covering many matters of first importance to the Farming Industry.

ATTENDANCE.

In the absence of the President (the Hon. W. N. Gillies), who was in Melbourne on business in connection with the meat industry, the Vice-President (Mr. J. Purcell) presided.

There were also present: Messrs. H. C. Quodling, J. W. Davidson, W. J. Short, F. M. Ruskin, H. I. H. Ross, W. Ranger, S. J. Howe, F. J. Morgan, T. Muir, R. Swan, T. A. Powell, W. G. Bachelor, G. H. Pritchard, C. V. Hives, H. Keefer, W. Purcell, T. Flood Plunkett, J. D. Story, and J. F. McCaffrey (Secretary).

THE DIRECTOR WELCOMED.

Mr. L. R. Macgregor, the newly appointed Director of the Queensland Producers' Association, was officially welcomed by the members of the Council, and in the course of a brief acknowledgmeent he expressed his appreciation of the honour conferred upon him in being invited to organise the big undertaking upon which the Council had embarked. He had not underestimated the immense possibilities for the benefit of agriculturists and the State as a whole which lay ahead of the movement that the Council had brought into being.

“A Record to Lose.”

“I came here,” remarked the Director, “with a record to lose. There are few of the big agricultural schemes which have recently been brought into being in the Western State with which I have not been associated in some way or other, and I think that I can say that I have left behind over there a few monuments.” Continuing, Mr. Macgregor said: “I was privileged to enjoy the confidence of the agriculturists over there, and I thank you for the faith you have shown in me in asking me to come here. Confidence will be a matter of development. I trust that, as the days go by, your preliminary faith in me will develop into actual confidence and trust.

“Much has been accomplished by you in the way of preliminary organisation. I have had an opportunity of examining this in a casual way during the past day or two, and I should like to take this opportunity of congratulating all concerned on what has been done. I feel that the foundations of the structure have been well and truly laid.

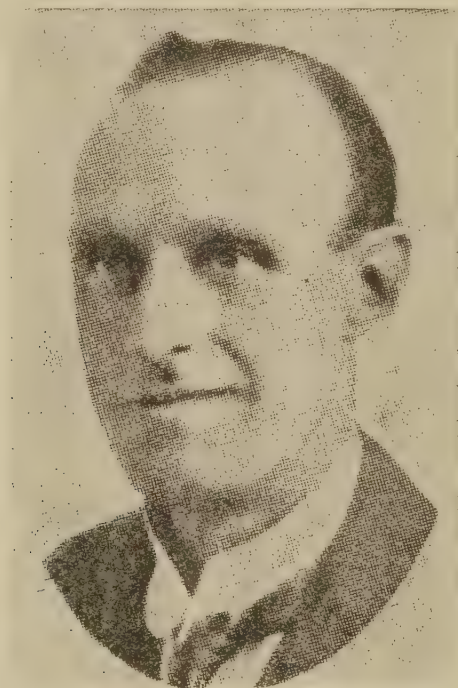


PLATE 52.—MR. L. R. MACGREGOR,
Director of the Queensland Producers' Association.

Unity and Co-ordination Essential.

“I would like to congratulate the agriculturists of Queensland,” continued Mr. Macgregor, “upon the way in which they have already organised themselves in various directions; for example, in the sugar and butter industries. In wheat, too, you have an object lesson here. The steps which have been taken by the primary producers in Queensland are being watched by producers in other States. Your influence has been felt elsewhere. Still there is much more to accomplish. There has not hitherto been that co-ordination of effort which is so necessary. The most pressing agricultural problems are national, and not sectional. They must be examined and solved from the broader standpoint, and the organisation which you have brought into being affords an adequate means whereby primary producers of all sections may act and work together for their common good. Without that essential co-ordination and the unity of the producers into one organisation, those problems cannot be properly tackled.

“One has only to mention such matters as conservation of fodder, finance of agricultural development, and stabilisation of prices, to realise that action by any

one section of agricultural industry would be well-nigh valueless. You have now in the Council of Agriculture that which you formerly lacked—viz., means whereby producers as a whole may speak with one voice and act in unison in seeking to solve their difficulties and effect pressing and necessary improvements.

From the Abstract to the Concrete.

“Some of these terms that I have used—Conservation of fodder, co-ordination of effort, stabilisation of prices, and exploiting of new markets—are all terms which have been talked glibly for long. It is now for this organisation to translate into action and give definite shape to these things which have hitherto been in the nature of ideals.”

In the course of further observations, Mr. Macgregor emphasised the importance of what sometimes is considered the subsidiary sections of the industry. He instanced eggs and honey, and in stressing this point stated that, although the United States of America is the greatest wheat-producing country in the world, the value of the eggs produced there is greater than the value of the wheat production. He referred to the value of organisation in creating a local market for honey in one of the other States, and said that this principle could be applied to some of Queensland's primary industries which are at present in a struggling condition.

From early years he had been associated with agricultural problems. He felt that in their scheme were potentialities of immense value to the producers of this State, and his best energies would be devoted to the service of the man on the land.

ADMINISTRATIVE COMMITTEE.

Duty on Imported Maize.

In connection with the duty on imported maize, a communication had been received from the Tariff Board to the effect that the duty on imported maize is 3s. per cental, but under the tariff agreement between South Africa and the Commonwealth maize of South African origin is admitted into Australia at a duty of 1s. per cental.

“The question of increasing the duty on maize from South Africa,” the communication stated, “is to be considered in connection with the new reciprocal tariff arrangements that are to be made between that country and the Commonwealth.”

The Council recommended that the reply from the Tariff Board be noted, and the following recommendations were approved:—

- (i.) That the Director be requested to collaborate with the Wheat and General Committee for the purpose of preparing a brief but lucid statement as to the importance of the subject to maizegrowers.
- (ii.) That such statement be communicated to Local Producers' Associations, and that they be invited to pass a suitable resolution to the effect that the Council make strong representations to the Tariff Board in favour of the recognition of the request of Queensland maizegrowers for an increased tariff on South African maize when the new reciprocal tariff arrangements are being made between the Commonwealth and the South African Union.
- (iii.) That such resolution be forwarded to the Minister for Trade and Customs and to the Queensland members of the Senate and of the House of Representatives.
- (iv.) That when the statement has been prepared it be communicated to the Press with an intimation as to the action which the Council of Agriculture is taking.

Advisory Board for the Fruit Industry.

The selection of producers' representatives on the State Advisory Board of the National Council of Fruitgrowers was approved by the Council of Agriculture as follows:—

- (a) The members of the Fruit Standing Committee of the Council of Agriculture—namely, Messrs. T. H. Brown, S. J. Howe, W. Ranger, H. I. H. Ross, and F. M. Ruskin;
- (b) Together with Messrs. Myles Fox, L. R. Macgregor, and J. R. Morris.

This Committee was directed to work in co-operation with the Council of Agriculture.

Local Producers' Association—Farmers Enrolling

The Supervisor of District Agents reported that very satisfactory progress is now being made by the district agents in the forming of Local Producers' Associations in their respective districts. Reports indicated that the policy approved by the Council in connection with the reorganisation of agriculture is receiving the support and co-operation of producers in all centres. At the present time 230 Local Producers' Associations have been formed, and 4,500 primary producers enrolled as members of the Queensland Producers' Association. Successful meetings have been held recently in the North, notably on the Atherton Tableland, Townsville, and Ayr districts, and large numbers of producers in each centre have enrolled. Similar satisfactory progress is reported from the North Coast, the Downs, and Western districts, where excellent enrolments have taken place. Provision has been made to enable producers in centres which have not yet been visited by the district agent to form local associations where such associations are not already in existence. This step has been taken in view of the fact that to enable producers in each centre to have a voice in the election of councillors, a Local Producers' Association must be formed not later than 30th November next.

Assistance in Water-finding.

The question of securing water supplies, being of paramount importance in the successful settlement of agricultural areas, which suffer periodically from inadequate rainfall, was a recommendation submitted for consideration by the Council on behalf of the producers resident in such areas. The Department of Public Lands advised the Administrative Committee that a tentative proposal designed to afford settlers in these areas with facilities for securing water has been formulated by officers of the Department, and the scheme has been under consideration by the Government for some time. The Government, however, has not yet arrived at a decision on the matter. The main difficulty, the Department advised, is finance, as obviously any such scheme must involve the outlay of considerable sums of money. An officer is employed by the Department, whose sole duty is to locate sites for obtaining subterranean stores of water. The services of this officer are made available at a purely nominal fee to all selectors throughout the State. It was decided that the Council of Agriculture make further inquiries as to possible future developments in the direction indicated.

Architectural Assistance.

In the opinion of the Administrative Committee it was thought desirable that the Council should be in a position to offer helpful advice and suggestions to producers in the matter of designs of buildings and equipment for butter and cheese factories, storage accommodation for fruit, and in other directions, and to that end the Committee recommended that the Council appoint a consulting architect, to be paid only for services rendered to the Council from time to time. The recommendation was approved, and it was decided that the consulting architect be asked to prepare suitable plans for a storage plant at Mapleton, with appliances to cope with 30,000 cases of oranges.

Administrative Staff

In connection with the permanent positions which it will be necessary to establish, the Administrative Committee was authorised to confer with the Directors regarding the duties to be allotted to each position, the salaries to be paid, and the conditions of appointment in each case.

DAIRY COMMITTEE.

In submitting his report to the Council, the Chairman of the Dairy Committee desired that the Commissioner for Railways be thanked for the assurance given at the recent meeting of the Transport Committee that no discrimination would be made in applying the 20 per cent. reduction to all dairy produce carried over the Queensland railways, irrespective of destination.

Stabilisation Scheme

Notwithstanding that butter factories in other States have agreed to fall in with the stabilisation proposals, and to stand by the producers, reports from Melbourne indicate that adverse propaganda in Victoria has induced ten factories to oppose the scheme. The acceptance of the scheme was conditional upon practically the whole of the butter and cheese manufacturers adopting it and binding themselves to abide by the agreement. In view of its importance to Australian dairymen, a further effort on the part of the Dairy Committee will be made to induce the opposing factories in Victoria to come into the scheme. Messrs. T. Flood Plunkett, W. Purcell, and W. T. Harris, who proposed to visit Melbourne for the purpose of attending the Federal Dairy Council meeting, were requested to endeavour, while in the Southern State, to induce the directors of the factories standing out to adopt the proposal which has for its objective the betterment of those engaged in the dairying industry and the maintenance of a fair price for their products.

Uniform System of Accountancy.

The desirability of a uniform system of accountancy for butter factories and kindred enterprises was urged by the Committee, and the Council approved of the appointment of a small expert committee to consider the whole question and report thereon to the Council.

FRUIT COMMITTEE.

The Fruit Committee recommended:—

- (i.) That concrete instances of loss of empty cases from canneries be brought under the notice of the Committee.
- (ii.) That in the opinion of the Fruit Committee the most effective way to guard against ravages by marsupials is by the erection of wire netting around orchards, and with a view of enabling growers to obtain wire netting at a reasonable price it is desirable that the netting should be purchased through co-operative channels in connection with the general question of co-operative buying for agricultural requirements.
- (iii.) That every possible protection be afforded to insectivorous birds, and that the Department of Agriculture be asked to afford protection to such birds.
- (iv.) That an effective system of centralisation be adopted in regard to canning factories; that legislation be introduced in connection with the rough handling of fruit.
- (v.) That the particulars relating to the prohibition of flashlights be brought under the notice of district agents and Local Producers' Associations.
- (vi.) That it be suggested that the subjoined minute be brought under the notice of the Director of Forests, with an intimation that the Local Producers' Association at Woombye reports that this is a serious matter to fruitgrowers:—

That pine logs and tops used for the construction of fruit cases be not subjected to Government royalty, and that action be taken to make those conditions apply to a large sawmill where case-manufacturing expenses can be reduced to a minimum.

The recommendations of the Fruit Committee were all approved.

THE FUTURE OF THE SUGAR INDUSTRY—CONSIDERED BY THE COUNCIL OF AGRICULTURE.

The Case for the Renewal of the Federal Agreement.

“The continuance of the Sugar Agreement is of vital importance to Queensland and Queensland producers, and to the Commonwealth as a whole.”

“The burden of the ‘WHITE AUSTRALIA’ policy is practically being borne by the sugar industry of Queensland, as the settlement of our Northern littoral by producers of cane grown by white labour is essential for the preservation of that ideal and for the purposes of national defence.”

At the last meeting of the Council of Agriculture reference was made to the present position of the sugar industry, and a strong case for the renewal of the Federal Sugar Agreement was made out by the Chairman of the Administrative Committee (Mr. J. D. Story).

In the course of his remarks Mr. Story said that the continuance of the Sugar Agreement is of vital importance to Queensland and Queensland producers, and to the Commonwealth as a whole.

On Thursday, 15th June, the Council, upon the recommendation of the Sugar Standing Committee, passed the following resolution:—

“That owing to the greater stability afforded to the sugar industry by the Sugar Agreement, this Committee recommends the Council to favour a continuance of the Agreement between the Commonwealth and the State Governments, and to undertake, through its District Councils and Local Producers’ Associations and affiliated societies, to further by every means the object sought.”

One of the objects of the organisation of the agricultural industry under the general direction of the Council of Agriculture was to give the producers an opportunity of taking concerted action in matters pertaining to agriculture as an industry. Seeing that the organisation of the industry had now proceeded to such an extent that 250 Local Producers’ Associations had been established throughout the State, and that additional associations are being formed daily, the Council was, he submitted, of opinion that the Organisation had so far advanced as to enable it to use its weight with effect in advocacy of a question of such very great importance to the State of Queensland and to the Commonwealth as the continuance of the Sugar Agreement. He moved—“That the Council therefore resolves:—

- (a) That the resolution regarding the continuance of the Sugar Agreement passed by the Council on the 15th June, on the recommendation of the Sugar Standing Committee, be communicated to each L.P.A.
- (b) That a brief, concise, but impelling presentment of the sugar question be submitted to each L.P.A.
- (c) That each L.P.A. be invited to pass at the earliest opportunity a resolution supporting the resolution passed by the Council.
- (d) That such resolution be communicated to the Council, and, by the Council, be transmitted through the proper channels, or direct, as the case may be, to the Prime Minister, the Minister for Trade and Customs, the Queensland members of the House of Representatives and of the Senate, and to the publicity agent in Melbourne who is watching Queensland’s sugar interests.

- (e) That the foregoing resolutions be communicated to the Press.”

The resolution was approved by the Council as a whole, and Mr. Story then dealt with the draft presentment of the sugar question and its importance to Queensland producers.

He said that in 1920, following decreased production, with the consequential importation of foreign sugar at a high price to meet Australia's requirements, the Commonwealth Government, in order to stabilise the sugar industry and to stimulate production, entered into an agreement with the Queensland Government to purchase the whole of the raw sugar produced in the State during the seasons 1920-21, 1921-22, and 1922-23.

Briefly, this agreement provided for:—

- (1) The purchase of raw sugar at £30 6s. 8d. per ton.
- (2) Equitable distribution of the £30 6s. 8d. to the producers, namely, the millowners and the canegrowers.

The Federal Government subsequently arranged with certain companies for the refining of such raw sugar and for its sale and distribution in Australia at 6d per pound, such price being necessary in order to provide funds sufficient to recoup losses incurred in respect of sugar importations.

Continuing, the speaker said that the continuance of the Sugar Agreement is of vital importance—

- (1) To Queensland and Queensland producers; and
- (2) To the Commonwealth as a whole.

To Queensland, because—

- (1) There are 25,000 persons directly engaged in the sugar industry in Queensland, of whom 4,000 are actually canegrowers.
- (2) There are approximately 100,000 persons, including the population of many of our Northern towns, who are directly and indirectly dependent on the industry.
- (3) There is approximately £15,000,000 invested in connection with the Queensland sugar industry in sugar mills, tramways, plantations, refineries, and other related enterprises.
- (4) The sugar industry is the most important rural industry in Queensland, both in value of production and in wages paid to those engaged in it.
- (5) The fixation of an equitable price for raw sugar ensures to the canegrowers a fair price for their product, and thus stabilises the industry and provides for the employment of a large number of workers at good wages.

To the Commonwealth, because—

- (1) The burden of the "White Australia" policy is practically being borne by the sugar industry of Queensland, as the settlement of our Northern littoral by producers of cane grown by white labour is essential for the preservation of that ideal and for the purposes of national defence.
- (2) There is no present prospect of the establishment of any other industry on a considerable scale on the rich tropical lands in the North, and the importance of the industry as a means of settling these lands and as a source of wealth to the community cannot be overstated.
- (3) Encouragement of the sugar industry by stabilisation will enable Australia to produce sugar sufficient for her own requirements and to be independent of foreign countries for her supplies.
- (4) Economically, it is better for Australian consumers to pay a fair price to Australian producers than to pay a lower price to foreign countries.

The Council of Agriculture approved of the Queensland Producers' Associations strongly supporting the representations now being made to the Commonwealth Government on behalf of the canegrowers in respect to the renewal of the Federal Sugar Agreement, on the grounds stated, for a further term, and agreed to submit the question for consideration by the Local Producers' Associations.

It is suggested that if the L.P.A.'s are in accord with the objective of the canegrowers, resolutions should be passed accordingly and forwarded to the Council.

GRAPE CULTURE IN QUEENSLAND.

By ALBERT H. BENSON, M.R.A.C., Director of Fruit Culture.

PART IV.

SUMMER PRUNING.

This is described in Mr. Ross's pamphlet as follows:—

"In the case of vines that have been properly spurred back at the winter pruning—*i.e.*, each spur pruned to one, two, or more eyes according to the vigour of the canes and the variety of grapes—each bud should have put forth one or more shoots. Where more than one shoot occurs, the weakest should be rubbed off, leaving one shoot only at each node. If the vine is not a vigorous grower, one shoot may be sufficient to leave on each spur; on the other hand, where growth is rampant, two or more shoots may be allowed to proceed from the spurs. Overcrowding is to be avoided by entirely suppressing some of the intermediary shoots where the long spur or cazenave is adopted.

"It often happens that amateurs and inexperienced growers leave many more bunches on the vine than it can properly support, especially in the case of young vines of three years old, and the consequence is that the bearing period, and even the life of the vine, is shortened, or its production diminished in after years; therefore, the disbudding of fertile shoots may be equally important with that of the barren ones. The uppermost shoot, or shoots, of a spur generally absorb an undue amount of sap to the detriment of the base shoot. Such growth must be carefully watched, and, if extraordinary vigour is produced, it may be checked either by bending down the shoot or pinching out the terminal points. The side branches from these shoots, called laterals, produced from below the node where the bunch is situated, should be rubbed out; but laterals from the nodes at and above the bunch may be pinched at the first or second leaf. The lower shoot of a spur—*i.e.*, the one nearest home—should be encouraged to grow strong, as this will constitute the fruiting spur for the following year. Indiscriminate topping must be avoided. The leading shoots of the vine should be allowed to extend their growth almost to an unlimited extent, but in cases where they are outbalancing the vegetative activity of the vine, they should be stopped. It is even better to bend down the shoots than to top them too severely. The object of this method is to preserve as much well-grown foliage as possible for the accumulation of sugar and elaboration of sap for the benefit of the fruit and lignification of wood. The bunches are always better developed, more handsome in appearance, and of higher quality when ripened in the shade; but when the shade becomes too dense it is better to strip off a few of the older leaves at the base that have fulfilled their purpose than to cut away the branches."

Water-shoots—that is, new growths starting direct from old wood and not from buds of the previous year's growth—should be removed, excepting where it is necessary to provide for a new spur or rod to take the place of one that has either died out or which has outlived its usefulness. In this case the water-shoot so left should be cut hard back the following winter so as to cause it to produce good fruiting wood for the succeeding season.

Different varieties of grapes require different methods of pruning; thus the following varieties should be spur pruned to not more than two eyes, *viz.* :—Alicante, Aramon, Black Hamburgh, Chaouch, Chasselas

(Sweetwater), Cinsaut, Cornichon, Doradillo, Frontignan (various), Muscats (all), Royal Ascot, Trebbiano, Waltham Cross, and Wortley Hall. The following varieties, however, require to be pruned long in order to produce the best results, viz.:—Almeria (Ohanez), Black Prince, Cabernet Sauvignon, Centennial, Gros Colman, Hermitage, Sultana, and Zante Currant.

The varieties mentioned both with respect to short and long pruning are merely given as examples, as it often happens that the method adopted must be modified so as to suit the growth of individual vines, even though they are of the same variety. Thus vines which produce too much wood in comparison with their yield of fruit should be pruned longer, and those that produce a number of small bunches and comparatively little wood should be pruned more severely.

In the case of Sultanas and Zante Currants, special methods of pruning are in use in some places; but as a rule the Cazenave Cordon that has been already described gives good results.

A very large number of different varieties of grapes have been tested from time to time in Queensland, and the following list includes those that have been proved by experience to be most reliable in the following districts:—

1. *Coast of Southern and Central Queensland.*—Black Hamburg in isolated districts, such as Pinkenba and Enoggera near Brisbane, Kolan district near Bundaberg, and Westwood near Rockhampton. Sweetwater.—In the same districts as Black Hamburg. Muscat Hamburg.—Enoggera, Kolan, and Westwood. Syrian.—Pinkenba and Westwood. Red Frontignan.—Rockhampton district. Chaouch.—Pinkenba. Madaline Royal.—Generally where the climate is not too humid. Wilder, Goethe, Iona Linoir, Concord, Alvey, Isabella, and Ferdinand de Lesseps.—Generally, except where the rainfall is too heavy or there is too much humidity.

2. *The Foothills of the Coast Range to the purely Coast Districts.*—All the grapes mentioned as suitable for the coast will thrive here, as well as the following:—Royal Ascot, Aramon, Cinsaut, Gros Colman, Trebbiano, and Sultana.

3. *Stanthorpe, Southern and Coastal Downs.*—All the varieties previously mentioned, as well as the following:—Alicante, Centennial, Doradilla, Gros Colman, Henab, Turki, Madrasfield Court, Mrs. Pince's Black Muscat, White Mourillon, Purple Cornichon, Black Prince, Waltham Cross, and Wortley Hall.

4. *Western Downs.*—All the varieties mentioned for the third district, as well as Gordo Blanco, Sultana, Zante, Almeria or Ohanez, Flame Coloured Tokay, and the following wine grapes:—Hermitage or Shiraz, Mataro, Grenache, Cabernet, Malbec, Roussane, Reisling, Semillon, Verdeilho, and Pedro Ximines.

Many other varieties than these mentioned can be grown, but the list I have given includes most of the sorts that have proved during the past twenty-five years to be most suitable for growing in the districts mentioned.

MARKETING THE CROP.

When grapes are grown for the fresh fruit trade, the greatest care should be taken in cutting, handling, and packing the bunches, as the price obtained will depend very largely on the condition in which the

fruit reaches its destination. It must not be bruised, and its natural bloom should be on the fruit when exposed for sale. Prior to packing, the bunches should be carefully examined and all injured, immature, or faulty berries removed. If the fruit is to be sent any distance it should not be packed until it has been gathered for some hours, in order that the stems may wilt a little, as by doing so there is less danger of berries leaving the stalks. The fruit should be quite dry, and when the stems are slightly wilted it should be so firmly packed in the case in which it is to be marketed that it will not shift during the journey. At the same time it must not be packed so firmly as to crush or injure the fruit in any way. The cases used to carry the fruit should always be lined with clean white paper, and the fruit should be graded for colour, size, and quality. It is a great mistake to market immature fruit, as there is no demand for it; and, further, it is very apt to prejudice those buyers who have been unfortunate enough to purchase it, and to put them off from making any further purchases. Grapes for wine should be fully ripe and perfectly sound. Immature grapes, over-ripe or decayed grapes, will never make a sound wine. They can, however, be made into wine fit to be put through the still for the production of alcohol to be used for fortifying other sound wines.

Hitherto very little attention has been devoted to drying grapes in this State, our local requirement for raisins, sultanas, and currants being met by the produce of the Southern States. Comparatively few kinds of grapes are grown commercially for drying, the bulk of the raisins, sultanas, and currants used in the world being grown from the White Muscat of Alexandria or Gordo Blanco, the Sultana or Thompson's Seedless, and the Zante or Corinth currant grapes. Other sorts are dried to a small extent, but the trade lines are confined to those mentioned. All these can be grown in Queensland, but before their produce is fit for drying it must be very rich in sugar; otherwise the fruit will dry light and be of poor colour and quality. This necessitates drying-grapes being grown in hot and dry districts, as it is only under such conditions that the fruit will produce a maximum sugar content in its juice and so produce a heavy, meaty, dried product. The manufacture of raisins, &c., should therefore not be attempted commercially unless the climatic conditions are favourable for the production of the right kind of fruit to dry and the right kind of weather in which to dry it.

MANURING THE VINEYARD.

If the soil is of good average fertility there is seldom any necessity to apply fertilisers during the first few years, as there is an ample supply of plant food quite sufficient for the production of strong, healthy vines capable of yielding good crops of fruit. Vines are not very severe on the soil, especially if the ashes obtained from burning the prunings are returned to it. At the same time, if the vines show signs of deterioration not due to disease or drought they will benefit materially if judiciously manured. A complete manure for vines should contain its plant food in the following proportions—viz., three parts phosphoric acid, three parts nitrogen, and five parts potash. An acre of vines in full bearing will require a manure containing 30 lb. of phosphoric acid, 30 lb. of nitrogen, and 50 lb. of potash, and these plant foods can be supplied by 2 cwt. super. or basic super., 1 cwt. sulphate of potash, and 1½ cwt. sulphate of ammonia.

Where green crop manuring is applied, the quantity of sulphate of ammonia can be materially reduced, and on granite soils containing

potash there is seldom any necessity to apply this plant food, but an application of basic super. and sulphate of ammonia or its equivalent in nitrogen in the form of green manure will be ample.

Soils deficient in lime should receive a dressing of about 1 ton of air-slacked lime or finely ground limestone every five or six years, as lime is essential to the proper development of the vine and forms an important part in the ash constituents, especially in that of the wood. Basic super. is preferable to ordinary super. in all soils that are at all sour or are in any way deficient in lime.

DISEASES OF THE VINE.

Vines are attacked by insects of many kinds, and are very subject to fungus diseases, especially in districts where the climate is more or less humid, and even in drier districts during periods of prolonged rainfall. Fungus diseases, however, do little damage when the climate is hot and dry during the growing and ripening periods. With respect to insect pests, the most serious is phylloxera, but fortunately there is, as far as I am aware, now no trace of this pest in the State, though it made its appearance here in one district some eleven years since. The steps taken for its eradication have evidently been a success, as I have neither seen nor heard of any trace of this pest since my return to Queensland in 1915, so I trust that the State is now free from it. *Phylloxera vastatrix* is a very minute yellow insect that lives by suction on the roots of the vine and thus saps the vigour of the plant, and eventually destroys it. It produces small galls or swellings on the roots, and the plant soon shows signs of distress, such as losing its colour and presenting a generally unhealthy appearance. Plants such as described should be carefully examined, as should this pest make its reappearance it is very likely to spread rapidly; consequently action, to be effectual, would have to be taken immediately. There is no cure for this pest other than absolute destruction. Certain varieties of grapes are able to resist its attack and are used as stocks on which to work more susceptible kinds, but none are immune. Every necessary precaution is therefore being taken to keep our State clean.

Vines are frequently attacked by nematodes which infest and destroy the roots, especially those growing near the surface. At first sight the attack of nematodes may easily be mistaken for phylloxera because, like that insect, they produce numerous small galls or swellings on the roots, but when these are examined by means of a good lens the difference is easily recognised. No minute yellow aphids are seen, and the galls when cut open show the cysts of the nematodes. In severe cases the roots are badly injured and large galls are formed. Nematodes are very difficult to destroy once the soil has become infested, but fortunately the damage they cause can be, to a very great extent, prevented by not allowing the growth of any surface roots, as the roots coming from the base of the cutting are seldom badly attacked.

Leaf-eating insects of various kinds, such as caterpillars of sorts, grasshoppers, crickets, weevils of sorts, &c., frequently injure the leaves, shoots, wood, and fruit, but the damage they do can easily be prevented by the judicious use of arsenate of lead spray, either alone or in combination with Bordeaux or Burgundy mixtures.

The larvæ of several species of borers also destroy the wood. Spraying with arsenate of lead will destroy the mature insects, but the larvæ are best destroyed by cutting out and burning the wood in which

they are harbouring. Scale insects are sometimes troublesome, but as a rule if the vines are properly treated in winter these do little damage. Should it be necessary to spray specially for these pests the spraying should be given before the scales are fully developed, when a weak oil spray will prove effectual. Mealy bugs have also given trouble the last year or two in some coast vineyards, by attacking the bunches when approaching maturity. Under normal conditions this pest is kept in check by predacious ladybirds, but when the latter are absent the best remedy is to spray the bunches with clean water applied with sufficient force to dislodge the insects, as sprays sufficiently strong to kill them would be apt to seriously damage the fruit.

ANTHRACNOSE OR BLACK SPOT OF THE VINE.

This is undoubtedly the most difficult pest the grapegrowers of this State have to contend with, as no part of the State is free from its ravages, and very few of the varieties of *Vitis vinifera* are immune to its attack. American varieties and resistant stocks are more or less immune, but unfortunately they are not of anything like the same commercial value, either for table use or winemaking, as those of the true grape or *Vitis vinifera*. Some varieties are, however, much more resistant than others, and the growth of such should be encouraged and that of highly susceptible varieties should be discouraged, as the cost of treating the latter will, in many cases, be greater than the value of the returns. The treatment of this disease is mainly a preventive one, as once it has made its appearance in a vineyard, although it may be checked, it cannot be stamped out, and where the weather conditions are favourable for its development it will frequently increase and spread in spite of all treatment.

The main object is, therefore, to endeavour to destroy all traces of the disease whilst the vine is dormant, during winter, and to follow up this winter dressing by a systematic treatment commencing when the buds begin to swell and continuing till the fruit is fully developed.

The winter treatment is given when the vines have been pruned and whilst they are still dormant. It consists, first, in gathering and burning all prunings; second, in removing all loose bark, superfluous or overgrown spurs, and carefully burning same; and, third, in painting or swabbing the whole of the vine with a concentrated solution of sulphate of iron and sulphuric acid, made by dissolving 5 lb. of sulphate of iron in a gallon of water and adding to it $\frac{1}{2}$ lb. of commercial sulphuric acid.

This, in my experience, is the best winter treatment, though the use of a 10 per cent. solution of sulphuric acid, made by adding 1 lb. of sulphuric acid to 9 lb. of water, is also a very good remedy.

The object of the winter treatment is to destroy the resting spores of the fungus which are harbouring in the vine, and thus to give the young growth in spring a fair start. The winter treatment must be followed up by spraying with Bordeaux mixture—first, when the buds are swelling, and subsequently as often as necessary to protect the young growth. Bordeaux mixture is not a cure once the disease has made its appearance, though it will even then tend to check its spread; but if systematically applied in time it is a preventive, as the spores of the fungus cannot germinate on the wood, leaves, or fruit that is protected by the spray.

Where owing to weather conditions proving favourable for the spread of the fungus or from other causes the disease becomes well established, badly infested shoots should be cut off and burnt, and every care should be taken to see that the following winter's treatment is rigidly carried out.

OIDIUM OR POWDERY MILDEW OF THE VINE.

Like anthracnose, this disease is much easier to prevent than to cure once it has become firmly established; the treatment is therefore a preventive one, and consists of sulphuring the vines, as the fumes that are given off from the sulphur dusted on the vines will prevent the germination of the spores of the fungus. The first sulphuring should be given when the vines have made a few inches growth, and subsequent dressings should be given as required, the frequency or otherwise of such dressings depending on weather conditions. With dry weather there is not much chance of the fungus making a start, but with the advent of moist, muggy, or foggy weather it soon gets to work, and regular and systematic treatment is then necessary. The sulphur should be in the finest state possible, as the finer it is the better the results, and it is best applied by means of a special sulphuring machine, though should such a machine not be obtainable a sulphur bellows or even a bag of moderately open texture filled with sulphur and tied to the end of a stick and shaken over the vines will do.

Where neglected, oidium completely destroys the crop in bad cases, the berries being all stunted, discoloured, and frequently cracked, where Bordeaux mixture is being regularly used for the treatment of anthracnose, there is seldom any necessity to take special precautions for oidium, as the mixture is an effectual preventive.

DOWNY MILDEW.

Downy mildew can be prevented by systematically spraying the vines before it appears. Growers are urged to spray for their own protection. In respect to sprayings definitely provided for by the Regulation, it is questionable whether the first spraying, which is given just before the buds burst, is actually needed, but it is certainly of great value in the case of anthracnose or "black spot," which is a very serious and common fungoid disease of the vine. It is often found attacking the same plant as downy mildew, and should not be neglected. The second spraying before the vines blossom—that is, when they have grown from 10 to 18 inches—protects the new growth from infestation; and the third spraying, given when the blossom has set, protects the foliage produced after the second application.

If the weather conditions are very favourable for the development of the fungus causing downy mildew, viz., warm, moist, or foggy, it may be necessary to give an extra spraying, or even two, between the second and third sprayings. These extra applications may be made even during the blossoming period, as it is better to run the risk of losing a few berries than the loss of the whole crop. The number of sprayings necessary after the fruit has set will depend entirely on the weather. If it is warm and dry, further applications may not be necessary, but if moist and muggy, spraying must be continued, otherwise the new growth will suffer and the bunches will become affected.

The fungus that causes downy mildew is not merely a surface growth, but it extends right through the vine and is carried over from season to season by the spores that remain dormant in the old leaves during the winter and become active in the spring—probably about the end of September or early in October in the coastal districts, and a little later

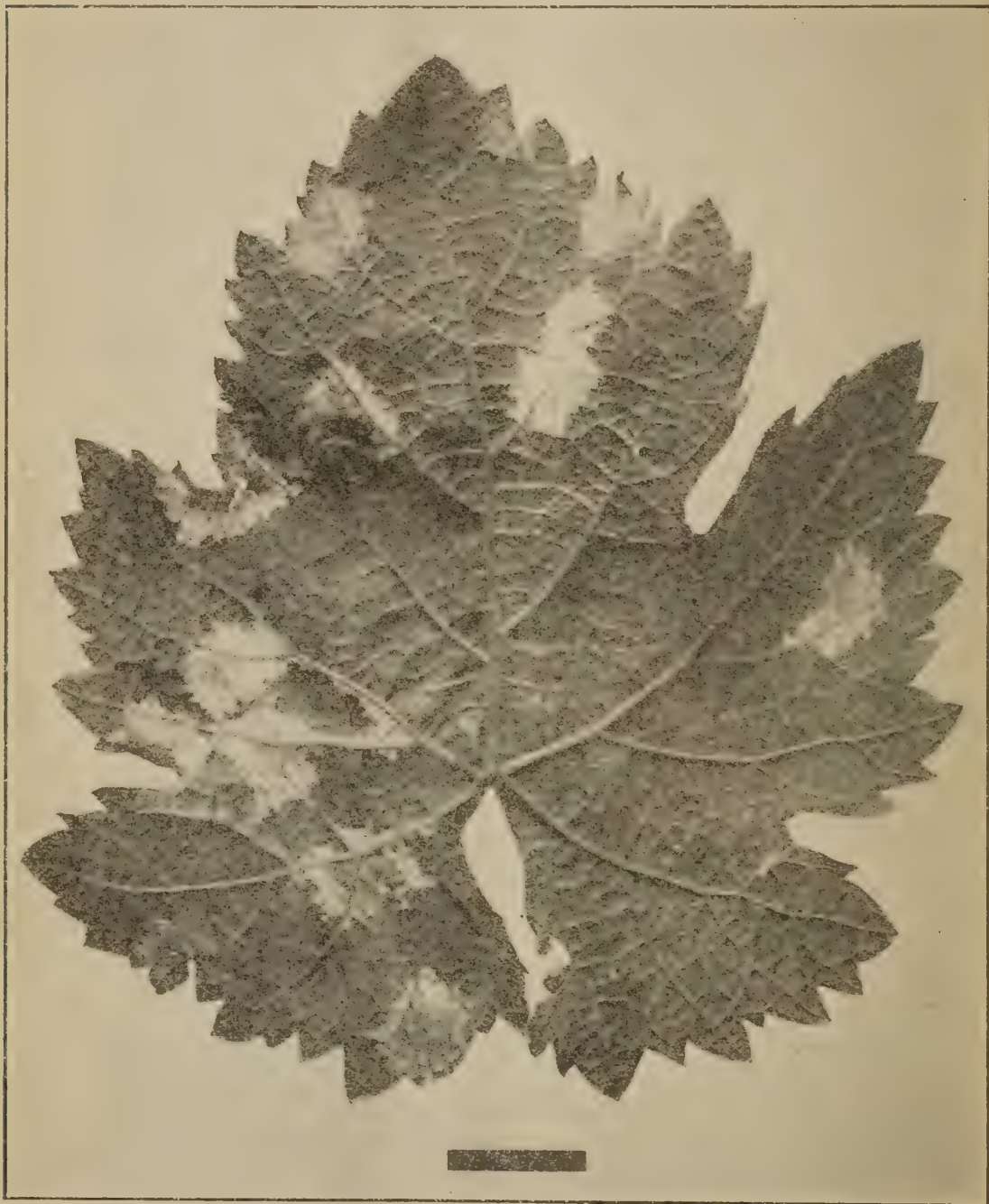


PLATE 53.—DOWNY MILDEW ON VINE LEAF.

in inland regions. These spores are carried by the wind, and, if they lodge on the upper side of a moist vine leaf, they begin growth at once, provided the atmospheric conditions are favourable and the leaf has not been protected by spraying with a germ-destroying specific.

The first sign of a disease is a brownish spot on the upper surface of the leaf that looks as though a drop of oil had been deposited upon it. This is known as the "oil-spot" stage. In the course of a day or so a white downy growth appears on the under side of the leaf exactly opposite the "oil spot," and it is from this development that the disease takes its name. This downy growth produces countless spores, which are distributed broadcast by the wind. Each of these spores is capable of reproducing the disease if it comes in contact with a vine leaf under conditions favourable to its development.

When neglected, downy mildew spreads with alarming rapidity when the weather is favourable, and the entire crop of a district may be destroyed in a very short time; hence the great importance of taking precautionary measures.

The illustration herewith gives a good idea of the disease in the "downy" stage, and should enable anyone to recognise it at once. In the later stage of the disease the leaves turn brown, dry up, and fall off, the fruit is destroyed, and, in severe cases, all new wood growth is killed, so that not only is there no crop for that season but none also for the following year.

REMEDY.

The remedy for this disease is to give the leaves of the vine a protective covering before the resting spores become active in spring, and to keep them protected as long as risk to the crop exists. The best spray is Bordeaux mixture, 4-4-40; 4 lb. bluestone, 4 lb. quicklime, and 40 gals. water, made according to the directions given in departmental publications dealing with the destruction of fruit and vegetable pests. The spraying material must be neutral; that is to say, it must not contain any free sulphate of copper (bluestone), and this is determined by adding a drop of a solution of ferro-cyanide of potassium to a small quantity of the mixture. If there is no discoloration, the mixture is neutral, but if there is a brown ring round the drop of ferro-cyanide, free bluestone is present and more lime must be added. If vignerons have any difficulty of obtaining ferro-cyanide of potassium, a small quantity of the solution for testing purposes can be obtained from the Agricultural Chemist.

Bordeaux Mixture (4-4-40) is prepared as follows:—

- (1) Dissolve 4 lb. of bluestone in 20 gallons of cold water in one cask by placing it in a bag and suspending it in the water.
- (2) Slack 4 lb. of unslacked lime in another cask slowly by first pouring about 3 pints of water over it. This will reduce the lime to a thick cream free from lumps. Water should now be added, stirring well till there are 20 gallons of milk of lime in the cask.
- (3) Stir the milk of lime up well, strain it and pour the whole of the 20 gallons of milk of lime and the 20 gallons of bluestone water together slowly into a third cask; stir well for 3 minutes, and if properly made the mixture is fit for use.

The mixture is much better if made in this manner than when a strong solution of bluestone and lime is first mixed together, and water to make up the required quantity is afterwards added.

In order to see if the mixture is properly made, plunge the blade of a knife into it for a minute. If the knife is untarnished, the mixture is all right; but if the knife is stained a coppery colour, then more milk of lime must be added. This is only a rough test; and where accuracy is necessary the mixture should be tested as follows:—To a small quantity of a solution of ferro-cyanide of potassium in a test tube or small glass add a few drops of the mixture to be tested. If it turns brown, more lime is required to be added till the mixture fails to produce the brown colour. The solution of ferro-cyanide of potassium is made by dissolving 4 oz. of this substance in one pint of water. The resultant mixture is very poisonous, and should be handled with care.

The mixture should always be neutral, as if there is an excess of bluestone it is apt to injure the foliage. Use water that is free from iron, and do not make the mixture in iron, zinc, or tin vessels of any kind—wood is the best.

If desirable, a stock solution of bluestone may be kept on hand for use as required. Such a solution may be made by dissolving 100 lb. of bluestone in 50 gallons of water. Place the 100 lb. of bluestone in a bag and suspend it in the cask of water, and in the course of a couple of days the whole of the bluestone will be dissolved, and each gallon of the solution will contain 2 lb. of bluestone.

To make the 40-gallon solution you therefore take 2 gallons of the stock solution of bluestone and add 17 gallons of water to it, to make up the 20 gallons of bluestone solution for mixing with the 20 gallons of milk of lime as previously described. A stock solution of milk of lime can also be made, but it is better to make it as required.

POURRIDIE OR MOULDY ROOT.

This is a rotting of the roots, due either to the presence of a fungus such as *armillaria*, to unsuitable soil, or bad drainage. Liming the soil is the best remedy, but when the vines are badly diseased it is better to take them out and burn them. Sulphate of iron applied to the trunk and main roots in winter has sometimes a good effect.

SHANKING.

This term is applied to cases when the vines blossom and yet fail to set their fruit. It is not, properly speaking, a disease, but is due to physiological conditions such as sudden climatic changes, inherent weakness in the vine, failure to produce perfect flowers, &c. Certain varieties are more subject to it than others, and the following remedies are suggested:—Cincturing the shoot just below the joint where the bunch starts a few days before blossoming; or pinching the bearing shoot just prior to blossoming, or sulphuring the vine whilst in blossom. If neither of these remedies has any effect, the only thing to do is to cut the vine back and graft it with a variety that is a regular setter.

FRUIT FLY INVESTIGATIONS.

The Minister for Agriculture and Stock (Hon. W. N. Gillies) has made available the following report from Mr. Hubert Jarvis, the Entomologist in charge of Fruit Fly Investigations at Stanthorpe, dated the 27th August, and covering the period 14th July to 20th August, 1922.

WINTERING OF FRUIT FLY.

Renewed search has been made for the pupæ of the fruit fly (*B. tryoni*) in the soil under orchard trees in the following districts:—Stanthorpe, Applethorpe, Diamond Vale, Thulimba, The Summit, Cotton Vale, Beverley, and Ballandean.

In no instance were any live pupæ met with, nor were empty pupæ-cases by any means plentiful—the majority, if formerly present, having probably rotted and gone to pieces in the soil.

PUPÆ IN PACKING SHEDS.

An instance of fruit fly pupæ (two only) wintering in apples (Rhymer variety) stored in the packing-shed was brought to my notice by Mr. D. Pfunder, of Applethorpe. A search on 3rd August, 1922, in this orchardist's shed resulted in two more specimens being secured. These were found in the crevices between the flooring boards; empty pupæ cases (from which the flies had probably emerged in late autumn) were quite numerous here also.

Search in and under other packing-sheds in various parts of the district has failed so far to bring to light additional specimens of living fruit fly pupæ.

EARLIEST APPEARANCE OF FRUIT FLY.

Experiments are being conducted to ascertain the position or locality in the Granite Belt in which the fruit fly makes its earliest appearance.

DESTRUCTION OF MAGGOT-INFESTED FRUIT.

A very interesting experiment, originated and carried out at Ballandean by Mr. A. E. Watts, of that district, seems to indicate that the burying of maggot-infested fruit between two layers of fresh lime might prove an effective means of destroying the maggots of the Queensland fruit fly (*B. tryoni*).

Mr. Watts in this experiment used a large tin vessel, about 2 feet 6 inches in diameter and about the same in height. At the bottom of the vessel he first placed about 2 inches of soil, then 1 inch depth of fresh lime next the fruit (maggot-infested peaches), this three-parts filling the vessel; then again another 1-inch or 1½-inch layer of lime; and finally on top a dressing of soil.

The contents of this receptacle so charged were recently turned out in my presence, and were then examined by me for any indication of fruit fly pupæ or maggots; but a careful search failed to reveal any sign of either.

A similar method of dealing with maggot-infested fruit might be tried in the orchards, a trench being substituted for the tin vessel. The contents of this trench could, moreover, when well rotted, be used for manuring the orchard with advantage.

It would be advisable, when dealing with a large quantity of fruit in the above manner, to use more lime proportionately than the amount used by Mr. Watts in his experiment.

FRUIT FLY IN IMPORTED ORANGES.

The danger of importing fruit flies into the Granite Belt of Queensland from New South Wales, in orange and other fruits, was recently emphasised.

Mr. C. G. Williams, Government Inspector Diseases in Plants Act, submitted to this Office an orange taken from a consignment sent to Stanthorpe from the latter State. On examination fruit fly punctures were seen to be present, with eggs (hatched) *in situ*. The young maggots had, however, perished, presumably owing to their being unable to penetrate the white felty substance between the outer skin and the fruit.

Other injurious insects found also on imported fruit submitted by the above-mentioned officer for identification were red scale (*Aspidiotus aurantii*), circular black scale (*Aspidiotus ficus*) and Glovers mussel scale (*Mytilaspis gloveri*), all on citrus fruits.

Thus the value of daily inspection work now being carried out can hardly be too much stressed.

OTHER INSECTS OF ECONOMIC IMPORTANCE.

San Jose Scale (Aspidiotus perniciosus).—An instance of this destructive scale-insect occurring on hawthorn hedges in Stanthorpe was recently brought under my

notice by Inspector C. G. Williams. These hedges are growing in the Stanthorpe town area, and are very badly infested with San Jose scale. Constituting, as they do at present, a serious source of infection to adjacent orchards, they should be either effectively sprayed or destroyed.

Grasshopper Eggs (Cedicia Sp.).—Specimens of these eggs attached to wood of fruit trees have been sent to this Office from various localities in the Granite Belt. These flat oval eggs, laid symmetrically in rows on the young shoots of peach and apricot trees, &c., are the ova of a green grasshopper (*Cedicia Sp.*). The eggs hatch in the spring and so give rise to numerous little grasshoppers, and these, by devouring the foliage and gnawing the young fruit, do a good deal of damage. The shoots harbouring these eggs should, when found, be snipped off and destroyed.

A small black parasitic wasp is a valuable ally in keeping this grasshopper in check, as will be seen on examination of these eggs, when numerous small round holes made in many of them by the wasps in emerging, after having completed their work of destruction, will be met with.

Scolytidid Beetle (Xyleborus solidus Eichf. ?).—Many plum and apricot trees that have died (probably owing to some fungus trouble, "Sour Sap," or bad drainage) exhibit in the trunk and branches small round holes each about one-sixteenth of an inch in diameter. These are thought, erroneously, by many orchardists to be the cause of the death of the host-tree.

These holes are made by a small wood-boring beetle (*Xyleborus sp.*). This little insect is not, as is often supposed, the primary cause of the host-tree dying. It, indeed, rarely makes its appearance until the tree is in a failing condition, or quite dead. It is particularly partial to apricot and plum trees, and although many specimens of their wood showing the work of this beetle have been submitted to me, I have not, as above suggested, so far found it doing any damage to healthy trees.

Cherry Wood-borer (?Maroga unipunctana, Donov. Cryptophagidæ).—This destructive moth-caterpillar has so far this season been rarely met with. In one instance, however, a three-year-old tree was completely rung around by its agency.

It usually makes its presence known by webbing over the injured part, covering the investing material with small particles of gnawed wood and frass (excreta). The insect is a night-feeder; one allied in habit may be found here in its native habitat boring in the wood of the honeysuckle (*Banksia sp.*). The moth is a very beautiful insect with white satiny wings; these, when expanded, measuring about $1\frac{1}{2}$ inches across.

Dried Apple Beetle (Doticus pestilans Olf.).—Several small dried apples were contributed by Mr. C. Warren, Thulimba, as harbouring maggots or grubs, and the latter on examination proved to be the larvæ of the dried apple beetle (*doticus pestilans*—*Anthrribidæ*).

This little beetle is extremely partial to dried or mummified apples that have been left remaining on the trees. I have also found it in shrivelled peaches, boring into the stone in their case.

The beetle, about $\frac{1}{8}$ -inch long and brown in colour, is very active and flies readily.

It deposits its eggs on the dried apples or peaches (as the case may be) in late autumn, these eggs in due course giving rise to the grubs noticed.

I have never known this beetle to attack sound fruit.

Cup Moth (Doratifera vulnerans—Limacodidæ).—The cocoons of one of the cup or slug moths (*Doratifera sp.*) attached to the wood of James's seedling plum were brought to this Office by Mr. A. E. Pfunder, of Applethorpe.

The slug moth caterpillars are stout and thick-set (*i.e.* slug-like) in form, and have the extremities of the body produced into raised tubercles, each tufted with spines that come away and enter the skin when the insects are carelessly handled, causing sometimes much pain and irritation. The caterpillars devour the surface tissue of the leaves of the host-plant. This is, as far as I am aware, the first instance of a *Doratifera* larva being found in plum trees, although W. W. Froggatt and others record *Doratifera vulnerans* as attacking the foliage of the apricot. Usually, however, these peculiar caterpillars of deciduous fruit trees are to be found in the bush on various species of Eucalyptus, on whose leaves they feed, and it does not appear that the insect in question is likely to prove a pest of economic importance.

PLANT PATHOLOGY.

Several diseases of fungus origin, attacking deciduous fruit trees in the Granite Belt, have been forwarded to the Entomologist-in-Chief, Mr. Henry Tryon, who in his work is called upon to exercise a special knowledge of Plant Pathology.

One of these maladies, locally known as "Bark Canker" or "Scaly Bark," is very prevalent in the area mentioned on both pear and apple trees, and Mr. Tryon's identification of this disease and his report on the same will doubtless be of some interest to the district's orchardists. On this disease, whilst he treats of a second also, Mr. Tryon states as follows:—

Coniothecium Bark Canker.—With reference to the fruit-tree affections brought under notice in your communication of 28th ultimo and illustrated by specimens at the same time forwarded, I have to inform you as under:—

"(1) Apple.—Disease prevalent in apple, pear, and plum (and peach) wood all over district. Specimen apple from J. Sewell's orchard.

"This trouble, which is not uncommon in Stanthorpe orchards (in apple and pear), is immediately caused by a parasitic fungus *Coniothecium chromatosporum*, and may be termed Bark Blister rather than Bark Canker.

"The organism, that has dark brown mycelial threads, forms obscure dark cloudiness and spots in the dead cuticle and makes also the underlying tissue in which it thrives almost black also. These threads, again, course from cell to cell of the outer bark and replace their contents with closely packed-together short connected joints, the fungus finally producing masses of this short-jointed mycelium, whose divisions, by swelling, become spores, and on germinating eventually reproduce the organism.

"With the growth of the fungus in the outer bark the death of the latter ensues, this result being usually gradually realised. Apparently the parasite develops another phase form in which spores are produced in little receptacles known as *Phoma perithecia*.

"This disease also occurs in the pear, and on both it and the apple may do conspicuous injury by not only causing die-back, but by killing fairly large branches.

"Affected wood in which destructive changes are pronounced should be cut away and other parts treated with Bordeaux Mixture as soon as they are evidently affected, or may be in a condition to be so. Lime-sulphur should deter attack.

"Specimen No. 3 (Apple, J. Sewell).—Young wood, is an example of same disease.

"(Note.—That plum and peach trees are affected by the same disease is at least doubtful.)

"*Gloeosporium Bark Canker—No. 2 Apple.*—Die-back of graft (J. Sewell's orchard.)—The specimen exhibits an old wound extending inwards to the wood within a short distance of the cut end of the stock. (It is probable that the present noticeable development of the wound has been occasioned by the invasion of the fungus at the site of its occurrence.—H.T.) As the main course of the trouble the bark towards the top end of the latter, and which has merged with that of the scion in growth, has died through the attacks of a parasitic fungus *Gloeosporium malicortis*, that is now evident in the fruiting condition. The surface of the dead bark, in fact, is densely sprinkled over with small raised pustules, showing black-points, that have erupted through them, and that contain cavities (in a fungus stroma) in which the oblong spores are packed to ooze forth, when wet conditions obtain, to spread further trouble of the kind.

"This disease also affects the fruit at an earlier season of the year, causing the condition known as "Bitter Rot," and eventually results in mummified apples that, remaining on the trees, develop further disease on the wood (through infection, say, at the site of a wound); or, falling to the ground, infect the soil that on being applied to grafted stocks may cause trouble, such as has been remarked.

"It would be interesting to ascertain to what extent this trouble is prevalent in the Granite Belt. One would like to receive additional specimens from other local sources in order that this point may be elucidated.

"The use of fungicides, as advised with respect to the former—apple disease (*Coniothecium*)—is indicated; also the observance of orchard hygiene (picking up and destroying apples showing bitter fruit rot and gathering and burning mummy fruit."

CONCLUDING REMARKS.

I am indebted to the following orchardists for specimens and material received during the month:—Mr. A. E. Sewell and Mr. D. Pfunder, Applethorpe; Mr. A. Hall and Mr. A. H. Paget, the Summit; Mr. C. Warren, Thulimbah; Mr. M. Lucas, Beverley; Mr. J. Teitzel, Broadwater; Mr. A. E. Watts, Ballandean; Mr. J. McCook, Wyberba; and Mr. B. Watkinson, Stanthorpe.

It is, it need hardly be said, of great assistance to this Office (and, indirectly, to the Granite Belt fruitgrowing community) to receive from orchardists specimens of any insects, harmful or otherwise, that come under their notice, more particularly of those having any bearing on the fruit fly problem now being investigated.

SOME FACTS OF IMPORTANCE RELATING TO SHEEP MAGGOT FLIES.

BY PROFESSOR T. HARVEY JOHNSTON, University, Brisbane.

In an article published in this Journal in June, 1921, entitled "The Sheep Maggot Fly Problem in Queensland," the present writer presented a plan of proposed or suggested research work in connection with this important matter. Earlier in the current year (March, 1922) information was made public through the pages of this Journal relating to experimental work with the various chalcid wasps known to attack blowflies in this State. In the present article it is proposed to supply particulars regarding the duration of the various stages through which blowflies must pass in order to complete their life-cycle. The observations were made in Brisbane during a period of a full year, and a more detailed account of the investigation is being published by Mr. O. W. Tiegs and the writer in the "Proceedings of the Royal Society of Queensland" (1922, pages 77-104). The data contained in that paper have been freely utilised in the preparation of this article.

Any information ascertainable regarding the life history of blowflies is of value, as it may indicate the most suitable times or places in which to apply remedial measures. It should be emphasised that the observations were made in Brisbane (carrion being used as a food material for the maggot stages) and do not necessarily hold good for conditions in typical sheep country, more especially where flies are infesting sheep.

The insects particularly studied were the two species of "hairy maggot fly," viz., *Chrysomya albiceps* and *C. varipes*; the green bottle fly, *Lucilia sericata*; the grey flesh flies, *Sarcophaga* spp.; and the shining black blowfly, *Ophyra nigra*; while short notes are added regarding certain others, and information is supplied concerning the known range of flight of certain blowflies in the United States of America.

CHRYSOMYIA ALBICEPS.

This bluish-green fly is generally regarded as the chief sheep blowfly (the larger hairy maggot fly) and is more commonly known under the name of *Pycnosoma rufifacies*. Recent investigations have shown that it occurs commonly in India, where its larvæ live in carrion. Dr. W. S. Patton, who has devoted much time to the study of Indian blowflies, has quite recently stated that the maggots of this species are predatory, preying on and destroying the larvæ of other blowflies, amongst the eggs of which the female *albiceps* deposits her eggs. If this be the case, and provided the larvæ do not themselves cause myiasis, i.e., infestation of a living animal by fly maggots, then the insect regarded as the primary sheep blowfly in Australia would really be one which is assisting in controlling those flies (whatever they may be) which actually cause the injuries. Experiments have been planned with a view to ascertaining whether the observations recorded in India hold good for Queensland also. It is, of course, possible that the "hairy maggots" feed not only on the larvæ of other carrion-frequenting flies, but also on the inflamed diseased tissues of living sheep whose injuries may primarily have been caused by one or more species of blowfly (*Lucilia*, for example).

The egg was observed to hatch in 16 or 17 hours during summer, 18 or 19 in autumn and spring, and about 21 hours during winter. The time required when eggs are laid on the wool or in injuries on living sheep would, perhaps, be a little less than 16 hours during the height of a fly season. The resulting larva feeds for 4 or 5 days (sometimes 6) when in carrion, but probably for a shorter time when infesting living animals owing to more favourable conditions of temperature and moisture. Then it ceases taking nourishment and commonly wanders during this so-called prepupal period in order to reach a suitable place where it may undergo pupation, which frequently occurs well below the surface of the ground in the neighbourhood of the spot where it finished feeding. This preparatory or prepupal stage varies in length according to temperature and humidity being shortest ($1\frac{1}{2}$ to 3 days) in summer, lengthening to a week or 10 days in winter. Hence the total time passed in the larval stages varies from $5\frac{1}{2}$ to 8 days in summer to as much as 15 days in winter. The larva now become a pupa, from which after a period of 3 to 8 days in spring, summer, and early autumn, and 10 to 20 days during the rest of the year (say, May to September), the adult fly emerges, leaving an empty pupa-case or puparium behind. If we add together the length of these various periods (egg, larval, prepupal, and pupal), we ascertain the length of time which elapses between the deposition of the eggs by a female fly and the emergence of the flies which have ultimately developed from such eggs. This period was found to be shortest during February, our minimal observation being between 9 and 10 days, which agrees with what Dr. Illingworth reported as having noticed during midsummer in Hawaii. The time noted as being

required in Brisbane varied from 9 to 14 days in midsummer (December to March), lengthening in spring and autumn to from 13 to 17 days and in winter to a period of from 3 to 5 weeks. E. Jarvis indicated that 11 days were needed in Longreach in October, with an average mean temperature of 75.5 degrees Fahrenheit, the combined egg and larval stages requiring 7 days and the pupal stage 4. We found that in Brisbane during the dry month of October 13 days were needed for these periods. Mr. Froggatt reported that less than a fortnight was required in New South Wales (presumably during summer).

The writer ventures to express the opinion that, when bred in living sheep, the period between egg-deposition and fly-emergence in Queensland sheep country will probably be between 9 days and a fortnight, except during the dry season, when the pupal stage will be prolonged for an additional 7 to 14 days, as it will be subject to atmospheric and ground conditions, so that the full period may then be between a fortnight and a month. The very rapid increase in the number of flies soon after rain is almost certainly mainly due to the influence of moisture on the pupæ, which then rapidly complete their metamorphosis, and emergence occurs; hence abundance of flies soon make an appearance.

We cannot give definite information as to the length of time required to elapse after emergence before these flies begin to lay eggs, though 5 or 6 days seem to be needed. If these figures be correct, then during the hot moist midsummer months one may expect a new generation of flies in from 14 to 21 days. In other words, the short period of from 2 to 3 weeks would be sufficient to allow the laying of eggs by a mother fly and egg deposition by her daughter which developed from such eggs.

We do not know how many batches of eggs, nor how many eggs in each batch are laid; nor do we know how long the adult fly may live under natural conditions, but it was ascertained that when bred in captivity in Brisbane they could live for at least 30 days, though 15 to 26 days represented the more usual period. Flies generally live a shorter time during warm weather when their activity is greatest, but in our observations no marked difference was noted in regard to this particular species.

CHRY SOMYIA VARIPES.

The small greenish blowfly whose larva is the lesser hairy maggot is more commonly known in this State as *Pycnosoma varipes*. It frequents carrion. Its eggs require from 17 to 19 hours to hatch (October to April). The larva, whose habits are similar to those of the preceding species, feeds for a period ranging from less than 3 days to 5 days, the shortest periods being during January and February, and 4 to 5 days during the remainder of the year. Then follows a prepupal period of one to two days in summer, lengthening to a week or more in winter, so that the total time occupied by the larval stages ranges from 4 to 7 days in summer and upwards to 13 during winter. The succeeding pupal condition requires from 2 to 5 days (usually 4) in suitable situations in summer, and as much as 1 to 3 months in winter. Thus the combined egg, larval, prepupal, and pupal stages—i.e., the time from egg-deposition to the emergence of the fly—may be as short as 8 days in February (8 to 14 days in summer), lengthening to 2, 3 or even 5 weeks, as the temperature and humidity fall.

As in the case of *C. albiceps*, we do not know what period elapses before the emerging fly can lay eggs, nor how many batches are laid. It was ascertained that in captivity the adult fly could live from 19 to 20 days throughout the year, a period similar to that recorded above for the related fly. It should be mentioned that, as far as was observed, there was no attempt at pairing in either case during captivity.

LUCILIA SERICATA.

The "green bottle" flies, which are readily attracted to carrion and house refuse in our Australian cities, are generally regarded as belonging to the above-named species. Amongst the other species of this genus known to occur in Queensland there might be mentioned *L. solaia* and *L. fuscina*. *L. caesar* has been reported from New South Wales. We find that at least two species are common in Brisbane. The name *L. sericata* is provisionally accepted as designating the commonest species met with locally, and the following data relate to it:—

Eggs hatch in from 16 to 18 hours during summer, but rather longer (up to 24 hours) when conditions are either drier or colder. The larva, when bred in carrion, feeds for 4 or 5 days, sometimes 6, then wanders away, and after a lapse of from 2 to 5 days more (excepting during winter, when as much as 3 weeks may elapse) it passes into the pupal condition, in which it remains for from 6 to 8 days (ranging to 17 in winter). The fly, then, emerges in from 12 to 16 days, usually 13, from the time that the egg was laid, except during winter, when as long as 4 weeks may be needed.

From 6 to 10 days after emergence, pairing occurs and eggs are laid two days afterwards. It will be seen from these data that it is possible for a complete generation to be passed through in about 20 days under midsummer conditions in Brisbane, but judging from the findings of Bishopp and Laake, who reported that egg-laying may take place in Texas, U.S.A., in from 4 to 21 days after emergence, it is likely that the minimum period in Brisbane may be 3 or 4 days less than that observed by us; in other words, in 16 or 17 days.

Specimens bred and maintained by us in captivity lived from 12 to 36 days in summer, as well as in winter. Froggatt observed that during midsummer in N.S.W. 12 or 13 days were required between egg-deposition and fly-emergence, his observation agreeing with our own in regard to Brisbane summer. Similar periods were registered during summer in Texas, U.S.A., but it was found that in winter these became greatly lengthened and from 4 to 6 months were needed, owing to the colder winter climate. A similar result would no doubt be obtained under similar climatic conditions in Australia, the winter being passed through by means of prolonged larval and pupal stages.

LUCILIA CAESAR.

Lucilia caesar, which is reported to occur in this continent, has been found to be able to pass through its stages from the egg to the emerging fly in from 9 to 21 days during warm weather in Eastern Texas, U.S.A., and from 16 to 60 (generally 24) days in San Francisco, and to commence egg-laying in from 5 to 9 days after emergence, so that a complete generation may be passed through in a climate which more or less resembles that of Sydney in 15 or 16 days. No doubt, in Brisbane, if the fly occurs here, the required time would be probably less. The similarity in regard to the minimal time for these two species, *L. caesar* and *L. sericata* is noteworthy.

OTHER COMMON BLOWFLIES.

Calliphora augur (*C. oceaniae*).—This is the smaller of the two common blowflies met with, even in houses, especially during winter and spring in Brisbane. It may be recognised by the greenish-blue colouration of the upper part of the abdomen. It may either deposit maggots or lay eggs. In the latter case hatching may occur in a few minutes or may take as long as 6 hours, perhaps longer. The larvæ feed for 4 or 5 days; then follows a prepupal stage of 4 to 8 days, succeeded by a pupal stage of from 10 to 19 days, so that the length of time elapsing between the deposition of an egg or a larva and the emergence of the blowfly is about 18 to 20 days, but may extend to as much as 33 during winter in Brisbane. Froggatt reported that in N.S.W. during summer 14 to 18 days were needed, while in winter a period of from 6 weeks to 2 or 3 months was required.

Neopollenia stygia (*C. villosa*).—This is the rather large blowfly, dark-greyish in general appearance, but with a distinct golden colour on the lower surface of the abdomen. It is common in the vicinity of houses and will readily enter. Eggs are laid, but no details are available regarding the length of time required by the fly to pass through its different stages, though Mr. Froggatt ascertained that a fortnight was the average time needed in summer in N.S.W. from egg-laying to emergence.

Sarcophaga spp.—The flesh flies, which somewhat resemble overgrown house flies, differ in having on the thorax three instead of four dark stripes, and these are separated by grey, silvery, or golden colouration. We have ascertained that in Brisbane the larvæ feed during summer for from 3 to 6 days and for a week in winter. Then follows a prepupal stage of 2 or 3 days (7 to 9 or more in winter) and a pupal of from 5 to 9 days in summer, lengthening greatly during winter, as long as 16 weeks having been required in one of our experiments. The total time which elapses between the deposition of maggots by the parent and the emergence of the resulting fly is between 12 and 18 days in summer, but lengthening to many weeks and even to several months during winter, on account of the extension of the pupal period. In about 11 days after emergence flies begin to larviposit, so that during summer a new generation, *i.e.*, from the birth of the mother to the birth of the first offspring, may be produced in 3 to 4 weeks.

Ophyra nigra.—The rather small, shining, black blowfly which bears this name very commonly visits carrion in Eastern Australia. In Brisbane its eggs hatch in about a day, larvæ feed for 5 or 6 days, and then there follows a prepupal stage of from 7 to 11 days in summer, lengthening to 3 or 4 weeks during winter. The pupal condition is passed through in about a week in summer, but 2 or 3 weeks are needed in winter. Thus the time required for full development from the egg to the newly-emerged fly is about 3 weeks in summer, 4 weeks in autumn and spring, and as much as 10 weeks may be needed in winter. In from 5 to 7 days after emergence egg-laying begins, so that a complete generation is passed through during summer in Brisbane in from 24 to 37 days. Adults were found to live from 3 to 4 weeks in captivity after emergence.

Related to the two blowflies first treated of in this article is the well-known American screw-worm fly, *Chrysomya macellaria*, which readily attacks and deposits its eggs in domesticated animals as well as man, besides ovipositing in carrion. It passes through its combined egg and larval stages much more rapidly when infesting live cattle or sheep (4 to 5 days) than when in carrion (6 to 20 days). Then the maggots leave their food material and make their way below the soil to pupate, just as the majority of Australian sheep maggot flies do at this stage. After a pupal stage of from 3 to 14 days the flies emerge, and are capable of laying eggs in from 3 to 18 days. Consequently the whole life cycle from the egg to the emerging adult can be completed in a little more than a week under optimum conditions of temperature and humidity, such as obtain when the eggs and larvæ develop in living animals, while from flies so bred the period elapsing between egg-laying by a parent and egg-laying by the progeny of such eggs may be as short as 10 days. Bishopp stated that eight consecutive egg-depositions by one fly had been observed, the intervals being from 1 to 7 days; that under most suitable conditions batches were laid at intervals of 2 to 4 days; that the number of eggs laid in each batch varied from 40 to 248; that the greatest number recorded as laid by one fly was 1,228; and that there appeared to be from 10 to 14 broods each season in Southern Texas.

It would be of interest to possess accurate data regarding the length of the life-cycle of the Australian sheep maggot flies, when developing in or on living animals. In the light of our present knowledge effective treatment of blown sheep once a week would be sufficient if the medicament applied were such that its larvicidal action soon disappeared. This would probably be an expensive proceeding. It has been claimed that certain arsenic-containing mixtures now utilised remain effective for a considerable time, and that they not only destroy any larvæ present when the solution is applied but the poisonous action is exerted against the larvæ as they emerge from such eggs as may be laid subsequently on the poisoned wool.

FLIGHT OF BLOWFLIES.

Two matters of importance in connection with any serious attempt to control flies, whether they be house flies in a town or blowflies in fly-infested sheep districts, are a knowledge, firstly, of their favourite breeding-places and secondly, of the distance which such flies can travel whether with the wind, across it, or against it. We know that blowflies breed chiefly in carrion and various forms of refuse containing animal matter; consequently prompt destruction of all such material would bring about the control of blowfly infestation.

When dealing with the American screw-worm fly, Bishopp stated in 1915 that, after careful estimation, he considered that the carcass of one cow might produce upwards of a million of these flies. One may safely assume that a dead sheep can provide sufficient food to rear some thousands of blowflies under Australian conditions, especially if the atmosphere be warm and moist. It is of importance, then, to know the maximum range of flight of such insects. No information has been published regarding experimental work to determine the distances in Australia. Consequently, one can only draw attention to results obtained elsewhere.

Bishopp and Laake, using a series of traps arranged at varying distances approximately north, east, south, and west from a centre in a town in Eastern Texas, U.S.A., reported that suitably marked blowflies were recovered at the following maximum distances from the point of release:—*Chrysomya macellaria* (screw-worm fly) 15.1 miles, *Phormia* 10.9 miles, *Lucilia sericata* 1.2 miles, *L. caesar* 3.5 miles, *Synthesiomyia brasiliensis* ½-mile, *Sarcophaga* spp. 3 miles, *Ophyra* sp. 7 miles. The first-named is related to the Australian hairy-maggot flies which infest sheep, the third, fourth, and fifth species occur in Australia, as do species of the last-named two genera. We may then safely assume that Australian blowflies can fly for many miles from the place where emergence takes place. American observations showed that such dispersion occurred in all directions, and that though the chief stimuli inducing such dispersion seemed to be the desire for food and the desire for suitable breeding places, yet there was also a strong migratory instinct independent of these, especially in the case of *Chrysomya*. Widespread dispersion might be readily effected as many specimens of the last-named were caught in traps 8 miles distant in all directions from the point of release in less than 24 hours afterwards, and 10 miles in less than 48 hours. Even the house fly was found to be able to travel more than 6 miles in less than 24 hours, and the maximum distance from the point of release at which the species was collected was a little over 13 miles, while numerous specimens were recaptured at very considerable distances away, even when the position of the trap in which they were caught necessitated flight in some cases across the wind and in others against it. Marked flies were recaptured by these authors as late as 17 days after release in the case of *Chrysomya*, 15 days in the case of the house fly, 6 to 8 days for *Ophyra*, and 11 to 12 days for *Sarcophaga*.

From the results of these carefully planned experiments one can readily understand the possibility of the flock of a sheep owner who assiduously destroys all

carcasses and other fly-breeding material on his property becoming attacked by maggot-flies which have been bred from carrion many miles away. These facts should emphasise the need for continuous and concerted action by pastoralists against the breeding places of such flies. The writer does not desire to belittle in any way the excellent work being done in Queensland in connection with the treatment of sheep by dipping, jetting, spraying, &c., with some arsenical solution to protect them against fly infestation, but none of these methods attacks the root of the trouble. The poison applied no doubt destroys great numbers of flies while they are still in their early developmental stages (egg and larva), but the effect when compared with the enormous numbers of the pest can be but slight. One must not forget the extremely important part which climate plays in controlling or in increasing the blowfly population in any particular district. Climate may render the breeding material suitable or unsuitable, and besides it greatly influences the duration of the various stages through which flies must pass.

In this article no reference is made to utilisation of natural enemies of blowflies, such as the various parasitic wasps, since that aspect was dealt with by the writer in an article which appeared in this journal some months ago.

RAINFALL IN THE AGRICULTURAL DISTRICTS.

TABLE SHOWING THE AVERAGE RAINFALL FOR THE MONTH OF AUGUST IN THE AGRICULTURAL DISTRICTS, TOGETHER WITH TOTAL RAINFALLS DURING AUGUST 1922 AND 1921 FOR COMPARISON.

Divisions and Stations.	AVERAGE RAINFALL.		TOTAL RAINFALL.		Divisions and Stations.	AVERAGE RAINFALL.		TOTAL RAINFALL.	
	Aug.	No. of Years' Records.	Aug., 1922.	Aug., 1921.		Aug.	No. of Years' Records.	Aug., 1922.	Aug., 1921.
<i>North Coast.</i>					<i>South Coast—continued:</i>				
	In.		In.	In.		In.		In.	In.
Atherton	0·89	21	0·13	0·92	Nambour	2·04	26	0·77	1·63
Cairns	1·81	40	0·54	1·44	Nanango	1·47	40	0·58	0·45
Cardwell	1·34	50	0·18	1·38	Rockhampton ...	1·07	35	0·73	2·66
Cooktown	1·39	46	0·24	0·97	Woodford	1·90	35	0·58	1·07
Herberton	0·70	35	0·12	0·61					
Ingham	1·44	30	0·10	1·82					
Innisfail	5·37	41	1·53	3·74					
Mossman	1·36	14	...	0·79					
Townsville	0·48	51	Nil	0·16					
<i>Central Coast.</i>					<i>Darling Downs.</i>				
					Dalby	1·26	52	0·36	0·37
Ayr	0·56	35	Nil	0·41	Emu Vale... ..	1·23	26	0·46	0·36
Bowen	0·72	51	Nil	0·35	Jimbour	1·33	34	0·35	0·94
Charters Towers ...	0·54	40	Nil	0·64	Miles	1·25	37	Nil	0·60
Mackay	1·08	51	0·02	0·91	Stanthorpe	1·88	49	0·54	0·18
Proserpine	1·43	19	Nil	3·73	Toowoomba	1·79	50	0·49	0·84
St. Lawrence	0·93	51	Nil	0·62	Warwick	1·57	57	0·50	0·50
<i>South Coast.</i>									
					<i>Maranoa.</i>				
Biggenden	1·23	23	0·49	1·59	Roma	0·98	48	Nil	0·83
Bundaberg	1·40	39	1·10	0·85					
Brisbane	2·14	71	0·16	0·41					
Childers	1·30	27	2·03	1·45					
Cromahurst	2·32	30	1·18	1·45					
Esk	1·62	35	0·52	0·54					
Gayndah	1·26	51	0·51	0·59					
Gympie	1·88	52	0·15	1·30					
Glasshouse M'tains	1·66	14	0·87	1·45					
Kilkivan	1·60	43	0·71	1·05					
Maryborough	1·79	51	0·45	1·02					
					<i>State Farms, &c.</i>				
					Bungeworgorai ...	1·00	8	Nil	0·69
					Gatton College ...	1·25	23	0·21	0·22
					Gindie	0·82	23	Nil	1·05
					Hermitage	1·46	16	0·49	0·27
					Kairi	1·20	8	0·18	1·25
					Sugar Experiment Station, Mackay	0·99	25	0·05	0·64
					Warren	1·16	8	...	1·31

NOTE.—The averages have been compiled from official data during the periods indicated; but the totals for August this year, and for the same period of 1921, having been compiled from telegraphic reports, are subject to revision.

CANE PEST COMBAT AND CONTROL.

The Entomologist to the Sugar Bureau at Meringa, near Cairns (Mr. E. Jarvis), reports as follows for August, 1922.

CANE PESTS ON THE HERBERT RIVER.

A special visit of inquiry was paid to this district towards the middle of this month, with the object of reporting on various cane affections.

Rats and Gumming Disease appear to be doing most damage, but considerable injury is being caused also by cane-grubs and borers. Owing to co-operation on the part of the managers of the Victoria and Macknade mills I was enabled to get over the ground quickly, and so make the most of the limited time available. Interesting evidence bearing on the subject in question was obtained from the secretaries of the Herbert River and Macknade Farmers' Associations, and from Mr. Stephenson, of the Macknade mill, whose cordial assistance was much appreciated. Much of the information gathered will be found embodied in the following notes.

INJURY BY RATS.

This pest, which appears to be most plentiful on the Victoria mill side of the river, is said to be responsible for injuries second only, if not equal, to those caused by gumming disease, the loss from rats last year in the Victoria mill area being estimated, Mr. Thornton tells me, at £30,000 sterling. The rats breed mostly in swampy lands and creek beds, being most numerous on selections adjoining such places, more especially where the headlands are narrow in width and allowed to get very weedy. Unfortunately, they attack by preference the softer varieties containing most sugar, and by gnawing deeply into the basal portion of sticks will sometimes, when feeding among a heavy crop, bring to the ground in a single night scattered areas of cane of considerable extent. An offensive campaign has been started by the C.S.R. Company, under the superintendence of Mr. Stephenson, the plan of procedure being to distribute poison-baits manufactured by the Company to a number of controllers in the various rat-infested districts. These are supplied with a list of growers to receive the poison, and in the Macknade area a man acting under the controller's direction goes from farm to farm, systematically, laying the baits. Although supplied free of cost, many growers will not take the trouble to do the work themselves, unless their cane happens to be severely attacked. Many different poisons are being tried, but phosphorous bait is thought to have given the best result so far. To prepare a good bait of this description, dissolve 2 oz. of phosphorous in 50 oz. of boiling water; stir in slowly 40 oz. of flour, and when the mixture is almost cold add, while still tepid, 40 oz. molten tallow and 20 oz. sugar. Definite evidence with regard to the effect of these poisons is not always forthcoming, dead rats being seldom found, but I believe good work is being done, although we cannot expect to see any very decided results within a few months after application.

Control Methods.—Briefly, these should consist in such commonsense methods as—(1) leaving wide headlands and keeping them clean; (2) poisoning the rats, especially on infested blocks when nearly cut out, and during November and December, when rats are forced to congregate on smaller areas of uncut cane; and (3) cleaning up breeding haunts, when possible, in the immediate vicinity of plantations.

Experimentation with poisonous compositions should be continued with a view to the discovery of a more deadly, yet palatable, bait than those being tried at present. In this phase of the work we shall be pleased to co-operate with the C.S.R. Company.

GUMMING DISEASE.

This well-known bacterial disease is prevalent, Mr. Stephenson tells me, throughout the Herbert River district, occurring for the most part in Clark's Seedling (H.Q. 426). As this cane matures in about 11 months, is rich in sugar, and generally yields a heavy crop, it is naturally a favourite, and is grown here more than any other variety. A map of the gummed area is being prepared, and this should furnish interesting data regarding the porosity, drainage, &c., of the various soils affected. Good crops of gummed cane can be obtained, providing the trouble does not start during early growth. Unfortunately, however, the Badila is already affected, and it is feared may become more so as time goes on, unless Clark's Seedling can be quickly replaced by some variety less susceptible to the disease.

The variety H.Q. 409, although practically immune from gumming, is unpopular here because of its slow growth and tendency to arrow freely and very early. It appears, however, to be a heavy bearer, as from twenty-five to thirty sticks are often obtained from sets that have been planted 18 inches apart. Mr. Geeson tells me that he has grown as many as fifty-seven canes in a single stool of this variety.

Remedial Measures.—It is generally admitted that the chief factors responsible for the occurrence of gumming disease (*Bacillus vascularum*) are:—(1) Poor drainage; (2) an impervious subsoil within 2 or 3 feet from the surface; (3) defective cultural methods; and (4) an abundant rainfall. Topographical conditions, the physical nature of the land, and general texture of the soil, are supposed to exert no influence on its development.

According to Professor Cobb, this one condition of drainage has a most important bearing on the prevalence of gumming disease, and he recommends a rotation of crops, where possible, on land that has been long under susceptible varieties of cane.

A good instance of the benefit to be derived from proper drainage was brought under my notice at Halifax. The farm in question comprises about 60 acres situated on the river bank, and divided by a road into two equal portions. On one of these, which adjoins the river, good crops have always been obtained, while the cane on the other portion, bounded on the far side by a swamp, has invariably either failed or been scarcely worth cutting. Three different selectors were unable to do anything with this latter portion, but the present owner has succeeded in raising a fine crop of cane uniform in height throughout. This was effected simply by cutting a few deep main drains through the block emptying on to the swampy land, and running cross drains into them. The improvement of canes by selection, and the planting of immune or but slightly susceptible varieties is, of course, advisable, and I understand that the Company have this matter in hand. Less volunteering and the use of green manures would probably also tend to reduce the chances of gumming.

Little or no attention is being given to the selection of clean cane for planting, it being the practice on some selections to place whole sticks in the drills, and before covering chop them through here and there as they lie in the soil. Needless to say, such lax methods of planting are very unsatisfactory from an economic standpoint, as borers, gumming, or other diseases would thus escape notice altogether and have a good chance of spreading to clean areas. This factor is of primary importance, since it will be of no avail to thoroughly work and drain the soil unless clean sets are afterwards planted. Burning the trash has been recommended, as this gets rid of countless numbers of bacteria, spores of fungi, beetle borers, &c.

PEST DESTRUCTION FUND.

Grubs have been very troublesome in places. Collecting the beetles was discontinued at Cordelia about five years ago, with the result that during 1920 considerable losses were experienced, these becoming worse the following year (1921). During the present season, the damage in this district has been very severe, and I understand that collecting at Cordelia will be taken up again. At Macknade and Ripple Creek the growers pay so much per acre (up to 150 acres only) into the fund, the amount varying from 1s. 6d. to 2s. This method of payment is considered to be better than that of fixing the amount at so much per ton of cane. Naturally, the aim of both small and big farmers would be to produce as much cane as possible per acre, and so decrease the amount of the levy; thus a 24-ton crop at 2s. per acre would cost one penny per ton to protect from grubs, whilst a 36-ton crop at the same rate would mean a reduction to three-farthings per ton, and so on. In order to achieve this result, better methods of drainage, cultivation, seed selection, &c., would have to be adopted, meaning not only heavier crops but also minimum losses from gumming, grubs, and other diseases.

Beetles are paid for by the quart; 1s. for greybacks and 2s. for golden beetles. Last season, at Ripple Creek, 8,367 quarts were collected, costing £418 7s.; and at Macknade £280 5s. 9d. was paid for 5,618 quarts. Receivers get 5 per cent. of the cost of all beetles handled. Growers here are not slow to recognise the value of this controlling factor, since at Ripple Creek last year only two farmers objected to contribute to the fund, and at Macknade every grower subscribed to it. Beetles are caught during the first three weeks following emergence, and collecting commences directly they appear on the wing. In a general way grubs will attack most varieties of cane, but the stronger-rooting kinds are most resistant, as they do not go over so easily. Mr. Geeson planted a patch of Black Innis and Badila side by side, and found that the latter was badly attacked, while the Black Innis was not appreciably injured.

PARASITE OF BEETLE BORER.

The cane borer (*Khadiocnemis obscurus* Boisdu.) appears to be spreading on the Herbert River, although occurring at present mostly in the basal portions of canes. Rat-eaten sticks are very liable to become infested, as the beetles oviposit by preference in soft places where the rind has been gnawed off by rats.

The C.S.R. Company have established a breeding-cage at Macknade for rearing tachinid fly parasites, and I made arrangements with the Secretary of Macknade Farmers' Association to collaborate with them in this useful work, if necessary, in order that the parasites might have a better chance of spreading throughout the district with as little delay as possible. Mr. Stephenson is in control of the cage at Macknade, and has already bred and liberated a number of flies. In this connection it may be mentioned that tachinid parasites are at present emerging freely in our breeding-cages at Meringa Laboratory, and on the 25th instant 60 specimens (mostly females) were liberated by us among bored cane at South Johnstone, and three days later another lot of 25 were let go at Aloomba.

WHITE ANTS ATTACKING SUGAR-CANE.

Destruction of cane sets at Gordonvale by two species of white ants (*Termes meridionalis*, and *Eutermes fumigatus*) was first recorded by the writer in Bulletin No. 3 of this Office. The damage, however, occurred mostly in ground brought under cultivation for the first time, and is of minor economic importance. In such cases the presence of this pest is doubtless due to affected roots of big trees having been left ungrubbed.

I was much interested to learn from Mr. Geeson that a small species of termite is known to attack cane sets planted in well-worked land at Macknade. In one instance patches of cane affected in this way were found to be distributed over a field that had been under cultivation for the past thirty years.

THE BANANA BEETLE BORER.—III.

By JOHN L. FROGGATT, B.Sc.

Mr. Froggatt's first progress report appeared in the September issue, 1921 (vol. xvi., pp. 200-208). A second progress report was published in the May Journal, 1922 (vol. xvii., p. 240). The observations and conclusions embodied in the following report cover the period from January to July, 1922, inclusive.

The importance of the Banana Beetle Borer problem in its relation to the continued welfare of the banana-growing industry of Queensland is gradually becoming recognised, with the result that our knowledge of the distribution of the pest has been considerably augmented during the last six months. It is still, however, far from complete, and so long as our knowledge remains in this state the work of controlling or even checking the pest will be severely handicapped. We can definitely state that certain areas are infested by beetle borer, but it is extremely problematical whether we can say that even some of the other areas are free from this pest.

During the last six months banana beetle borer infestation has been found to be bad in three districts, slight in a fourth, and suspected in a fifth district from which it had not been previously recorded. It is too big an undertaking under existing conditions for even a small body of men, and still more so for individuals, to thoroughly examine every banana plantation in the State within a reasonable time in order to determine the presence or absence of banana beetle borer therein. The greatest difficulty is met with to induce a grower to admit that he has an infested plantation: rather is the short-sighted policy of "hush it up" preferred. The pest has to be coped with, and the sooner the better. It therefore behoves growers and their associations to assist the investigations by co-operating, rather than hampering them by standing aloof. Great assistance has been rendered by some growers, and their co-operation has been of great service and greatly appreciated.

THE EGG.

Further observations prove that the site for the deposition of the egg most generally favoured in standing plants is just about ground-level, the egg lying just underneath the surface of the plant. A few instances have been noted in which the eggs had been laid below the surface of the soil, more particularly in the suckers. In stems and corms lying on the ground the eggs were almost invariably laid on the underside.

Laboratory observations showed oviposition to be active up to the beginning of June, being highest in March, remaining high in April, and decreasing in May. With the advent of cold weather the number of eggs deposited decreased most markedly. Information obtained in the field corroborated these observations.

These data support the hypothesis that extremes of heat and cold decrease egg-development in a similar manner.



Photo : Dept. Agriculture and Stock.]

PLATE 54.—BUTT OF BANANA PLANT

Showing effect of infestation by *C. sordidus*. Scale, 2 centimetres (2 cent. = 1 inch).
Note—(1) tunnelling in outer part of corm ; (2) plant decay spreading from grub tunnels in centre of corm ; (3) destruction of central core of plant by grubs.

Oviposition, though existent throughout the life of the female beetle, is more active in the early stages than in the later ones of this. In no case were two or more eggs found in the one cavity.

The totals of egg counts from the imagos under observation (*see* Table D) are given in Table A. When comparing the number deposited with the number of beetles in each lot, it must not be forgotten that only a portion of the beetles were females. It is then obvious that a few beetles in a plantation will very rapidly increase to sufficiently large numbers as to cause appreciable damage.

All the observations tend to prove that the development of eggs in the ovaries of the females is not divided into periods for the production of one batch at a time, but that the process is continuous, the individual eggs being deposited as they are developed.

The period passed in this stage of the life cycle has shown wide variations under different climatic conditions. The minimum period noted was four to five days, with eggs laid between 25th January, 1922, and 1st February, 1922. Those laid up to 28th April, 1922, matured in an average of eight to nine days. Eggs deposited in the latter end of May, 1922, showed a marked increase to 27-31 days for the developmental period, while those laid early in July took 34 days to mature. Progressive average results are given in Table B.

LARVA AND PUPA.

As the larva (or grub) approaches maturity, it tunnels towards the outer margin of the bulb and comes to rest just underneath the surface. Before changing into the pupa (or chrysalis) it lies dormant for a time, exhibiting but little powers of movement if disturbed. The body becomes flaccid and elongated, losing the typical shape of the larva of this species.

Since it has not always been possible to ascertain the periods passed in the larval and pupal stages separately, these have been combined in the calculations. With eggs laid in March, 1922, the larval and pupal periods occupied an average of 34 to 46 days (min. 26; max. 48), and with those laid in April, 1922, these combined periods increased to an average of 68-76 days (min. 67; max. 78).

In the plant in the stool a considerable amount of the tunnelling by the grubs is done in the peripheral portion of the bulb. It is during this time that the greatest amount of harm is caused to the plant, because many root origins are damaged, if not destroyed, by the larva in its passage through the corm, not only then causing loss of sustenance to the plant, but also indirectly depriving it of sufficient support in the soil on account of the damaged and destroyed root origins leading to decay of these organs in their entirety. Decay of the plant tissue often follows, and spreads out from the grub tunnels, thus causing still further destruction of the bulb of the plant.

In stems the principal part traversed by the larvæ is the central core.

Pupæ were found in corms in the field on 30th July, 1922.

THE IMAGO (OR BEETLE).

There is no doubt that the beetle moves beneath the surface of the ground, even by day, but it has the strongest abhorrence of light, this being more marked with bright than with dull lights.

Although no positive proof has yet been established of the powers of flight of the beetle, it is possible that they exercise this power of migration only at a certain time of year.

During the colder portion of the year the beetles are particularly sluggish. In July, 1922, a large number of imagos was found in old larval tunnels in the corm of standing plants, where they were apparently sheltering; in every case an opening on to the surface of the bulb was present, communicating with the larval tunnels, and a greater number was present in these situations than could have bred in the bulbs, as shown by the amount of tunnelling.

Beetles have been found clinging to the bottom of plants standing in the stools, showing that in these situations, at any rate, they will burrow several inches below ground level.

Beetles, emerging from pupæ between 16th and 20th April, 1922, deposited fertile eggs between 26th and 29th May, 1922, giving a period of 36 to 43 days from emergence to mating and oviposition. These imagos were bred from eggs deposited between 1st and 13th March, 1922, thus giving the period from oviposition to oviposition by the beetles bred-out as 72 to 92 days.

In the case of eggs laid between 8th February, 1922, and 13th March, 1922, the full life cycle (deposition of egg to emergence of beetle) averaged 42.5 days to 51.25 days, and with those laid between 10th and 18th April, 1922, the cycle occupied an average of 78 to 83 days.

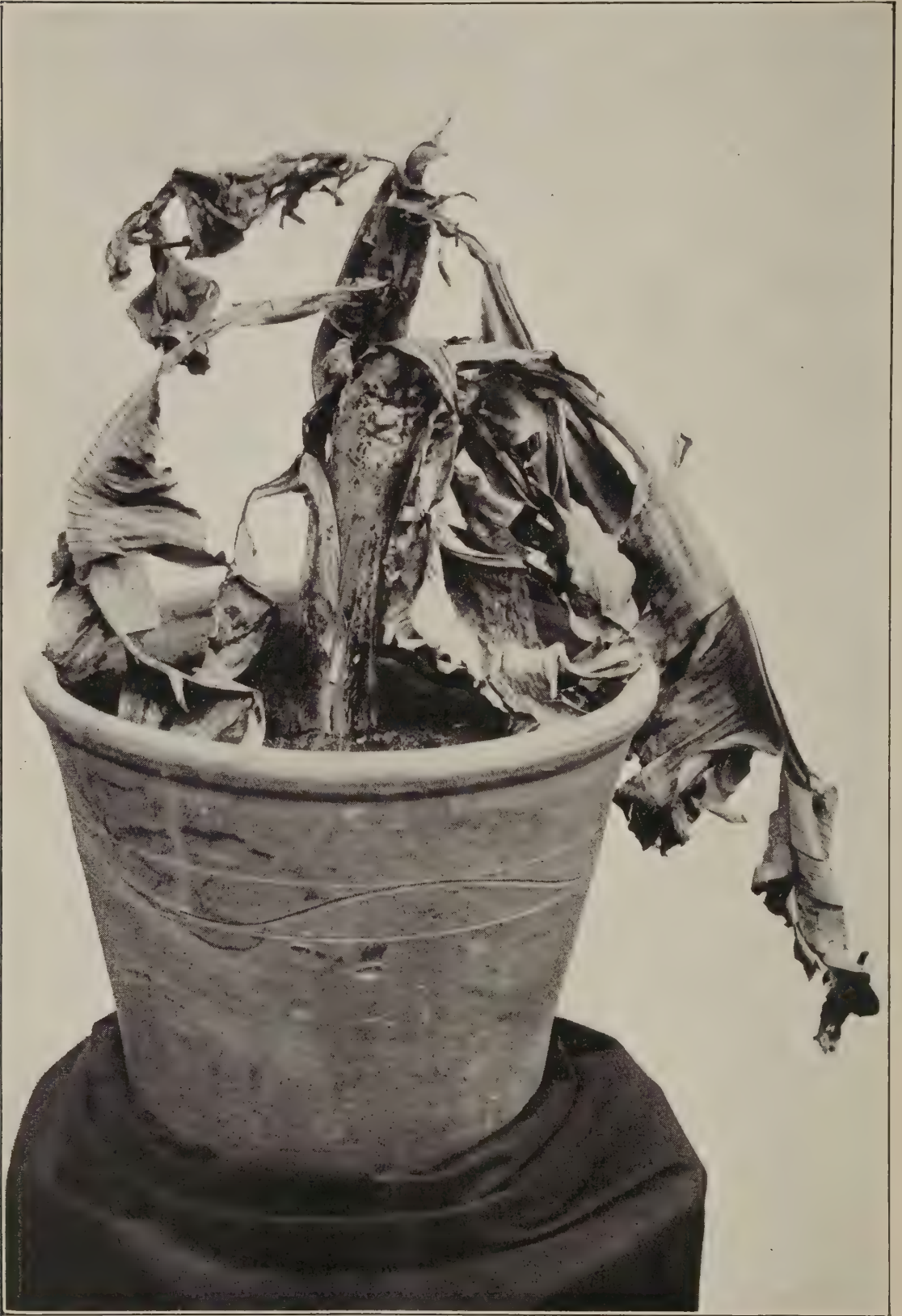


Photo : Dept. Agriculture and Stock.]

PLATE 55.—INFESTED BANANA SUCKER, SHOWING APPEARANCE OF PLANT.



Photo : Dept. Agriculture and Stock.]

PLATE 56.—INFESTED BANANA SUCKER, SHOWING APPEARANCE OF PLANT AND GRUB TUNNELS IN CORM.

Continued observations on the length of life of the beetles show that it is a very long one. In the series under observation, twelve lots have died out, yielding rather remarkable results. The imagos in five of these lots were collected in the field, and those in the other seven lots were bred between November, 1921, and January, 1922, from eggs laid in the office. Those collected in the field gave an average maximum length of life of 412.2 days to 420.2 days, while those bred out had an average maximum of 170 to 183.8 days. The longest life was shown in Lot B, 448 to 453 days. A single beetle bred in the office on 13th June, 1921, from a pupa collected in the field, lived for 365 to 368 days. This one was kept solitary for the whole period of its life.

The comparatively short life of the imagos in the seven lots quoted above is difficult to account for, as they were all kept under exactly similar conditions to the rest of the beetles. Details of the longevity of these imagos are given in Table C.

Of the remainder of this series the imagos in Lot E had a maximum length of life of 461 to 464 days to 31st July, 1922, and had not died out. These imagos were bred in the office from pupæ collected in the field. Progressive observations in the series in continuation of those given in the writer's second report, are appended in Table D. Those lots marked with an asterisk were bred in the office from pupæ.

A large number of tests have been made with different chemicals in order to ascertain what means can be employed for poisoning the beetles through the medium of baits. Banana corm has been used as the bait in all the experiments carried out to date. Both solutions and dry powders were used at different dilutions.

In each series of the "solution" tests three strengths of the solution were used. Pieces of corm were steeped in each strength for periods of time varying from one to twenty minutes, ten beetles being exposed continuously to each soaking of corm in each strength of solution for varying periods of time. In this way the optimum strength of solution and period for steeping the bait, as well as the period of exposure required to kill the beetles, were indicated from the one series.

In all the series of "dry powder" tests, the procedure was similar to that just given, except that one strength of the active principle was taken, and the pieces of corm were shaken up in the powder for periods varying from five to twenty minutes.

The tests were carried out in tins 4 inches by 3 inches by 2 inches, with lids, containing a little sifted soil in the bottom. At the expiration of the period of exposure of the treated material fresh corm was substituted for the pieces the beetles had been feeding on.

The chemicals tested to date are as follows:—

- Sodium arsenite in solution and as a dry powder.
- Mercuric chloride (corrosive sublimate) in solution.
- Barium chloride in solution.
- Lead arsenate as a dry powder.
- "Paris green" as a dry powder.
- Calcium arsenate as a dry powder.
- Borax as a dry powder.

In some of the dry powder series wheaten flour was mixed with the chemical as a diluent.

The dry powders gave more satisfactory results than the solutions, as a general rule. Paris green was the most satisfactory, the next in order being sodium arsenite. Borax appeared to be a slow poison, and yielded fair results.

Sodium Arsenite in Aqueous Solution was used, in one case, at a strength equivalent to 1 lb. in 5 gallons (2 per cent.). Corm was steeped in this solution for as long as 20 minutes, and the beetles exposed to the poisoned material for periods up to 48 hours, resulting in only 1 per cent. being killed after 24 hours and 40 per cent. dying within ten days of the inception of the tests.

Sodium Arsenite used as a Dry Powder diluted with three times its volume of flour killed 92 per cent. of the beetles, after their being exposed for 18 hours to the poisoned corm, which had been shaken for five minutes with the powder.

Barium Chloride, at a strength equivalent to 1 lb. in 2 gallons of water (10 per cent.), had no effect on the beetles, 100 per cent. being alive 16 days after the inception of the series, the periods for the steeping of the corm and exposure of beetles being the same as in the case of the sodium arsenite solution quoted above.

Paris Green, diluted with six times its volume of flour, killed 99 per cent. of the beetles after three hours' exposure to the poisoned corm, the latter being shaken for five minutes in the powder.

A considerable amount of work still remains to be done before any definite conclusions can be formed, so that these results cannot be considered as final, but are indicative of a portion of the work that has been carried out on this matter to date. They show, however, that large possibilities exist of materially aiding the present control measures employed in combating the pest by means of poisoned baits. Field tests will, of course, have to be made after the completion of those in the laboratory.

These tests have been seriously handicapped in their execution by the constant need of large supplies of beetles which were not always forthcoming.

The condition of the plants regarding virility has no influence on the female beetle in determining her selection of site for depositing eggs. In corms and stems lying on the ground, however, eggs have never been found in any part showing decay.

Cavendish, Lady's Finger, and Sugar banana plants are all attacked equally badly by the beetle borer. A few Gros Michiel plants have been seen, but they have invariably been growing in areas apparently free from beetle-borer infestation. This variety of banana plant is badly attacked in other parts, and therefore it cannot be considered, from the above statement, to be a beetle-borer resistant variety.

The distribution of the pest is very largely brought about by planting infested suckers or butts. Cases have been met with, however, in which the origin of infestation is most baffling.

It is often difficult to detect infested plants, particularly in plantations where the beetle borer is not numerous. Suckers may be removed from an infested area carrying eggs, be planted, strike, and even grow into fair plants, while one or two larvæ are developing in them without showing noticeable signs of infestation. The beetles, once established in the plantation, will quickly make their presence felt unless measures to combat them are rigorously carried out.

NATURAL ENEMIES.

No trace has so far been found of the natural enemy (*Plasius javanus*) of the beetle borer imported in small numbers from Java and liberated last year. Time will be required for it to multiply before it will be readily detected. This parasite, introduced into Fiji by Jepson in 1914, was not recovered in the field until the middle of 1921. Since then information has been received that further adults of this species have been collected there.

An Elaterid ("skip-jack") larva, very similar to that collected by Mr. Tryon in the Cooroy district in 1916, and again by the writer in 1921, was found in a larval tunnel of the beetle borer in the Buderim district on 14th March, 1922. Only a single larva was found, and this unfortunately died before reaching maturity.

CONTROL.

The basis for any means of control of the banana beetle borer must rest on keeping the plantation as free as possible from breeding grounds and harbourage (e.g., old corms, butts, and cut stems).

A badly infested stool is only a menace to the remainder of the plantation and should, therefore, be dug out and destroyed. In slightly infested stools old butts and infested material should be completely removed and either burnt or chopped up into small pieces, and the stems should be split in halves lengthways. By the opening up of corms and stems in this manner they will dry up or rot rapidly and cease to serve as either breeding grounds or harbourage. Wherever infested material is found, pieces of clean corm should be laid, cut surface downwards, flat on the ground, in or just outside stools or on the spot where infested cut stems, &c., are met with. These will act as baits for the beetles, and should be examined once per day; in the morning is best. The beetles will be found either on the under-surface of the bait or just underneath the soil under the bait. They can thus be collected and destroyed. No bait should be used for more than ten to fourteen days, as eggs will be laid in them and they will be thus liable to serve as breeding grounds: these pieces of corm should, therefore, be collected periodically and destroyed and fresh ones put out in their places. This procedure should be continued as long as beetles are caught under these baits. *These measures must be carried out thoroughly and continuously, however, to be effective.*

In order to guard against the spread of the pest into a new plantation, too much care cannot be exercised (1) in the selection of suckers to be used for planting, to ensure that they are free from any risk of being infested by the pest; and (2) in ascertaining that the site for the plantation is not adjacent to a beetle borer infested area.

Suckers may be dug in an infested plantation and be free from beetle borer when removed from the stool, but lying on the ground, often overnight, they act for the time being as baits. Beetles attracted to them deposit eggs which are extremely

difficult to detect, resulting in infested suckers being planted. Any which die off after planting should be dug out and closely examined for signs of beetle borer, evidenced by grubs or their tunnels, and possibly by beetles themselves.

Old butts, sometimes used for planting, are more readily examined than suckers for the presence of beetle borer, as the larval tunnels at least should be readily seen when the butt is opened up.

Plantations laid out adjacent to beetle-borer infested areas are very liable to become infested on account of the beetles migrating from the old into the new area, particularly as the food supply in the former become exhausted. Corm baits should be laid around the edge of the infested area and carefully examined periodically, and wherever practicable it is advisable for the growers' own benefit to dig out and destroy the infested stools whenever opportunity offers.

The presence of beetle borer in a mature plantation is most readily detected at any stage beyond that of the egg, by the presence of larval tunnels in old corms and stems; often the grubs and beetles will be found. Suckers showing an unhealthy appearance should be dug out and examined for signs of infestation.

Preliminary tests have just been started to ascertain if any method can be obtained which will be applicable to field conditions to free infested stools of the pest and prevent any reinfestation, and to prevent clean stools from becoming infested through the medium of treatment of the soil. These tests are in far too elementary a stage to warrant any comment on them at present.

In conclusion, I wish to express my indebtedness to Mr. Brünnich and members of his staff for supplying and preparing chemicals for carrying out much of the work on the poisoning of corm baits.

CONCLUSIONS.

1. The rate of oviposition is greatly influenced by extremes in climatic conditions.
2. The development of eggs in the ovaries of the females is affected by the age of the beetles.
3. The rate of development of the different stages in the life cycle of the beetle is greatly affected by extremes of heat and cold.
4. The life of the beetle is very long.
5. Poisoning of corm baits, under certain conditions, as a means of killing the beetles has yielded promising laboratory results.
6. Co-operation of the growers with the scientific investigators is especially required.

TABLE A.

Lot. (See Table D.)		EGGS LAID FOR MONTHS OF—							From 25th May, 1921, to 15th December, 1921.	Total Eggs Laid to 31st July, 1922.
		1922. January. From 15th.	February.	March.	April.	May.	June.	July.		
A	.. ..	7	7	0	..	..	..	..	242	256
B	.. ..	0	3	6	23	0	..	..	237	269
C	.. ..	2	3	11	3	0	..	..	680	701
D	.. ..	25	45	27	20	..	..	..	260	377
E	.. ..	2	0	0	3	0	0	0	50	55
F	.. ..	3	9	17	21	5	6	1	445	507
G	.. ..	45	52	117	176	57	68	16	1,153	2,084
I	.. ..	24	36	58	119	36	36	21	1,323	1,653
J	.. ..	0	31	52	26	5	6	3	436	559
K	.. ..	16	21	16	29	1	3	3	608	697
L	.. ..	10	13	43	24	0	0	0	345	435
M	.. ..	5	14	9	..	..	..	..	18	46
N	.. ..	10	21	29	11	5	0	0	..	76
O	.. ..	1	2	4	0	..	..	..	..	7
P	.. ..	3	4	8	0	0	0	..	..	15
Q	.. ..	9	7	18	19	..	..	..	..	53
R	.. ..	0	0	2	0	0	0	0	..	2
S	.. ..	2	5	40	17	0	..	..	..	64

TABLE A—continued.

Lot. (See Table D.)			EGGS LAID FOR MONTHS OF—							From 25th May, 1921, to 15th December, 1921.	Total Eggs Laid to 31st July, 1922.
			1922. January. From 18th.	February.	March.	April.	May.	June.	July.		
T	..	..	..	..	0	83	8	8	2	..	191
U	..	..	..	..	..	13	2	1	0	..	16
V	..	..	..	..	..	..	47	26	14	..	87
W	..	..	..	..	..	..	1	2	0	..	3
X	..	..	..	..	..	..	..	..	2	..	2
Totals ..			164	275	547	587	167	156	62	6,198	8,156

TABLE B.

Eggs Laid.				Days to show- ing of first sign of Man- dibles.	Days thence to emergence of first Larva.	Days for Total Emergence.
18-27 Jan., 1922	..	..	..	..	..	5-6
27 Jan., 1922, to 28 Feb., 1922	..	..	..	..	..	6-8
28 Feb., 1922, to 27 Mar., 1922	..	..	..	6	2	7-8
5-28 April, 1922	..	..	..	7	2	9-11
19-29 May, 1922	..	..	..	22	8	29-30
9-14 June, 1922	..	..	..	25	5	30-34
Minimum—						
25 Jan., 1922, to 1 Feb., 1922	..	..	..	..	..	4-5
Maximum—						
9-14 June, 1922 ..	..	..	..	25	5	30-34

TABLE C.

Collected or Bred.	Refer- ence to Table D.	Dates of Collection or Breeding.	Dates of Last Death.	Life of Beetles in Days.	Life of Beetles in Lunar Months, &c.
Collected ..	A	24-28 Jan., 1921	10-13 Mar., 1922	406-413	14 months 2 weeks to 14 months 3 weeks
Collected ..	B	3-5 Feb., 1921	26-29 May, 1922	448-453	16 months to 16 months and 5 days
Collected ..	C	8-12 Feb., 1921	18-21 Apr., 1922	369-376	13 months and 5 days to 13 months 1 week and 5 days
Collected ..	D	21-25 Apr., 1921	22-26 May, 1922	392-400	14 months to 14 months 1 week and 1 day
Collected ..	F	29 Apr., 1921, to 5 May, 1921	25 Jul., 1922, to 1 Aug., 1922	446-459	15 months 3 weeks and 5 days to 16 months 1 week and 4 days
Bred ..	M	11-27 Oct., 1921	10-13 Mar., 1922	134-153	4 months 3 weeks and 1 day to 5 months 1 week and 6 days
Bred ..	N	15-24 Nov., 1921	17-25 Jul., 1922	235-252	8 months 1 week and 4 days to 9 months
Bred ..	O	25-28 Nov., 1921	26-28 Apr., 1922	124-129	4 months 1 week and 5 days to 4 months 2 weeks and 3 days
Bred ..	P	2-9 Dec., 1921	19-23 Jun., 1922	192-203	6 months 3 weeks and 3 days to 7 months and 1 week
Bred ..	Q	2-12 Dec., 1921	9-14 Jun., 1922	179-194	6 months 1 week and 4 days to 6 months 3 weeks and 5 days
Bred ..	R	1-12 Dec., 1921	26 Jun., 1922, to 12 Jul., 1922	196-223	7 months to 7 months 3 weeks and 6 days
Bred ..	S	16 Jan., 1922 ..	26-29 May, 1922	130-133	4 months 2 weeks and 4 days to 4 months and 3 weeks
Bred ..	..	13 Jun., 1921 ..	16-19 Jun., 1922	365-368	13 months and 1 day to 3 months and 4 days
Bred ..	..	16 Jan., 1922 ..	26 Jun., 1922, to 12 Jul., 1922	182-198	6 months and 2 weeks to 7 months and 2 days

TABLE D.

Lot.	A.	B.	C.	D.	*E.	F.	G.	H.	I.	J.	K.	L.	*M.	*N.	*O.	*P.	*Q.	*R.	*S.	T.	U.	V.	*W.
Approx. Date Collected.	29-1-21.	7-2-21.	12-2-21.	20-4-21.	27-4-21.	5-5-21.	21-5-21.	24-5-21.	4-6-21.	18-7-21.	1-8-21.	16-9-21.	11-27/10/21.	15-24/11/21.	25-23/11/21.	2-9/12/21.	7-12/12/21.	1-12/12/21.	16-1-22.	21-24/2/22.	14-15/3/22.	10-11/5/22.	20/4/22.
No. Collected.	38	132	281	37	16	87	379	26	324	85	119	72	6	24	20	9	25	9	16	50	16	190	9
Alive on—																							
28-10-21	50.0	28.8	33.1	89.0	56.0	93.1	92.4	91.7	91.7	100.0	96.6	90.8	100.0	100.0	90.0	100.0	88.0	100.0	100.0	100.0	100.0	100.0	77.8
25-11-21	48.2	28.0	31.3	78.4	56.0	91.9	89.4	87.8	87.8	96.5	94.9	72.2	100.0	95.8	90.0	100.0	80.0	66.7	93.8	100.0	100.0	100.0	77.8
8-12-21	47.4	28.0	31.3	78.4	56.0	91.9	89.4	87.8	87.8	96.5	94.1	72.2	100.0	95.8	90.0	100.0	80.0	66.7	93.8	100.0	100.0	100.0	77.8
9-12-21	47.4	28.0	31.3	78.4	56.0	89.6	88.6	85.2	85.2	95.3	92.5	72.2	100.0	95.8	90.0	100.0	88.0	77.8	100.0	100.0	100.0	100.0	77.8
13-12-21	47.4	28.0	30.9	78.4	56.0	85.0	82.8	77.2	72.1	82.3	90.7	62.5	66.7	91.7	70.0	77.8	80.0	77.8	100.0	100.0	100.0	100.0	77.8
17-1-22	15.8	28.0	29.2	78.4	50.0	81.6	98.2	7.7	65.4	60.0	86.5	48.6	66.7	91.7	65.0	77.8	80.0	77.8	100.0	100.0	100.0	100.0	77.8
27-1-22	10.5	28.0	27.0	78.4	50.0	81.6	98.2	7.7	65.4	60.0	86.5	48.6	66.7	91.7	65.0	77.8	80.0	77.8	100.0	100.0	100.0	100.0	77.8
27-2-22	2.7	25.7	18.1	62.2	50.0	79.3	75.2	7.7	62.3	52.9	53.7	43.1	66.7	91.7	55.0	77.8	80.0	66.7	93.8	100.0	100.0	100.0	77.8
13-3-22	20.1	20.1	7.8	48.8	81.3	77.0	73.1	7.7	59.3	47.0	42.0	43.1	66.7	91.7	55.0	77.8	80.0	66.7	93.8	100.0	100.0	100.0	77.8
20-3-22	18.1	18.1	5.6	40.5	25.0	77.0	71.4	3.9	55.8	45.8	34.4	38.9	66.7	91.7	55.0	77.8	80.0	66.7	93.8	100.0	100.0	100.0	77.8
27-3-22	14.4	14.4	2.5	37.8	25.0	72.4	68.6	3.9	45.9	27.0	12.6	29.1	66.7	91.7	55.0	77.8	80.0	66.7	93.8	100.0	100.0	100.0	77.8
26-4-22	4.5	5.3	..	10.8	18.7	58.6	54.8	3.9	44.4	27.0	11.7	29.1	66.7	91.7	55.0	77.8	80.0	66.7	93.8	100.0	100.0	100.0	77.8
28-4-22	..	4.5	..	10.8	6.2	57.5	54.8	3.9	36.1	17.7	4.2	22.2	66.7	91.7	55.0	77.8	80.0	66.7	93.8	100.0	100.0	100.0	77.8
19-5-22	..	0.7	..	2.7	..	36.7	45.3	3.9	31.4	15.3	3.4	15.3	66.7	91.7	55.0	77.8	80.0	66.7	93.8	100.0	100.0	100.0	77.8
26-5-22	..	0.7	..	..	..	29.9	43.0	3.9	29.0	12.9	3.4	15.3	66.7	91.7	55.0	77.8	80.0	66.7	93.8	100.0	100.0	100.0	77.8
29-5-22	..	..	..	..	..	27.6	40.3	3.9	23.1	10.6	2.5	11.1	66.7	91.7	55.0	77.8	80.0	66.7	93.8	100.0	100.0	100.0	77.8
14-6-22	..	..	..	..	..	14.9	34.3	3.9	20.6	10.6	2.5	11.1	66.7	91.7	55.0	77.8	80.0	66.7	93.8	100.0	100.0	100.0	77.8
23-6-22	..	..	..	..	..	6.9	29.3	3.9	18.2	9.4	2.5	6.9	66.7	91.7	55.0	77.8	80.0	66.7	93.8	100.0	100.0	100.0	77.8
26-6-22	..	..	..	..	..	3.4	21.8	3.9	16.3	7.0	1.6	1.4	66.7	91.7	55.0	77.8	80.0	66.7	93.8	100.0	100.0	100.0	77.8
12-7-22	..	..	..	..	..	..	16.8	3.9	13.2	4.7	1.6	1.4	66.7	91.7	55.0	77.8	80.0	66.7	93.8	100.0	100.0	100.0	77.8
25-7-22	..	..	..	..	..	..	16.8	3.9	13.2	4.7	1.6	1.4	66.7	91.7	55.0	77.8	80.0	66.7	93.8	100.0	100.0	100.0	77.8
1-8-22	..	..	..	..	6.2	..	15.0	3.9	11.4	4.7	0.8	1.4	66.7	91.7	55.0	77.8	80.0	66.7	93.8	100.0	100.0	100.0	77.8

SUGAR : FIELD REPORTS.

The Southern Field Assistant, Mr. J. C. Murray, reports under date 7th September, 1922, as follows:—

Maryborough.—The areas under cane in this district are gradually being extended, especially in the direction of Magnolia. Much good land still remains to be cleared in this locality. As soon as the farmers get a guarantee of future stability, settlement will extend in these areas. Cane varieties making good progress on a number of farms are Meerah, Striped Singapore, Black Innis, N.G. 16, D. 1135, and 1900. Meerah has been giving good returns with an average c.e.s. value of 13 per cent. The growers are reminded to observe their cane carefully with regard to resistance, susceptibility, and tolerance to disease, and always keep ahead of them the fact that careful selection of plants is the most efficient method of keeping the field clean.

A cane which should do well in this district is E.K. 1. This variety is a good sugar-content cane, with a high resistance to disease, and of exceptionally good standover properties. Queensland 813 should be planted also. Farmers should guard against the unnecessary destruction of timber, as vegetation has a marked influence on the rainfall.

Pialba.—Cutting was in full swing at Pialba. The growers are going to have a fairly successful harvest, judging by the cane that is coming off and that which is to be cut. Cane varieties looking well at present are Shahjahaupur No. 10, Q. 813, Q. 970, Q. 1098, Q. 855, and H.Q. 77. These varieties are in a small plot established by a local grower. New canes obtained from the Sugar Experiment Stations very often do not get a fair trial, frequently being planted on a partially sterile portion of the farm—that which will not grow the staple variety. Of the canes mentioned above, Q. 970, Q. 1098, and Q. 813 should do well in the Pialba district. The growers in this area are advised to pay much attention to the question of deep cultivation and the planting of green-manure crops. Good fertiliser results have been obtained by using 5 cwt. per acre of a mixture containing 7 per cent. of nitrogen and corresponding quantities of potash and phosphoric acid.

Mount Bauple.—Growers here are doing good. If the farmers keep up the current standards in the subsequent cultivation, they will do much towards checking setbacks by dry spells. Varieties doing well at Bauple are Q. 822, D. 1135, Q. 813, and M. 1900 Seedling. Several growers are busy extending areas at present planted. The farmers' outlook is hopeful.

Very fair crops may be seen at Antigua. The prospect of stability in the sugar industry is acting as a stimulus, and it is the intention of settlers to extend their areas. Varieties making a good showing include D. 1135, Striped Singapore, Black Innis, Rappoe, M. 1900 Seedling, Mahona, and Malagache. Growers are advised, however, to concentrate on planting Q. 813, D. 1135, and M. 1900 Seedling as much as practicable. Green manuring should be undertaken as much as possible, as the colour and texture of the soil indicates a deficiency of humus.

Between Mount Bauple and Nambour, with the exception of Yandina, very little cane is growing at present. There is a big colony of ex-service men in these districts who have farms and who are looking toward the sugar industry as a means of making a living.

Nambour.—Progress is being made in this district with canegrowing. More attention is being paid to the question of liming and draining, especially on Petrie Creek and the Maroochy River, and the effect of these measures is already evident. The crushing here this year is going to be a good one. Conditions in this respect are better than was to be expected, as the heavy rains of early in the year were followed by an intensely dry period. Any growers who are ploughing out their stools after this cutting are recommended to get down as deeply as possible with the plough, and if possible to lime. Varieties on the Maroochy River and Petrie Creek areas that are doing well include Q. 813, H.Q. 285 (early maturing), N.G. 16, and D. 1135.

The growers are advised to include in their experiments Q. 970 and Q. 1098; also E.K. 1. Points farmers should note in studying canes are whether they strike well, if they are erect in manner of growth, whether the trash is adhesive or not, the resistance to disease and drought, and their c.e.s. value. Another important point is the standover qualities of the cane.

In the Mapleton district good progress is also being made with canegrowing. Mr. Story, who already has a considerable acreage under good milling cane, is extending his existing plantation by a number of acres. Some of the best canegrowing on the Maroochy River watershed is to be seen on the slopes below Mapleton, and the growers are strongly advised to keep on and extend their areas, keeping, however, out of the low-lying portions. The principal cane growing is H.Q. 285.

At Yandina, on the Maroochy River, there is a considerable acreage of cane growing. The variety Q. 813 is making an exceptionally good showing, as also is H.Q. 285.

The Northern Field Assistant, Mr. E. H. Osborn, reports under date 5th September, 1922, as follows:—

Bowen.—A few days were spent in this district early in the month. The weather conditions were then very dry, the total rainfall for the year up to then only amounting to 23.61 inches, and of this amount 0.13 fell in April, 0.11 in May, and 0.50 in June. Luckily a fall of 2.40 inches in July helped to improve the outlook very considerably.

Going through the district some very good irrigated cane was noted, mostly the Gorus (N.G. 24, 24 A, and 24 B), Badila, Q. 855, and D. 1135. On Mr. Burrell's farm the four latter-mentioned canes (plant) were showing a very fine growth, whilst some first ratoons of Gorus and D. 1135 also looked very well.

Mr. Burrell has now $7\frac{1}{2}$ acres under cane, and has just planted another $8\frac{1}{2}$ acres and intends to grub and plant a further 20 acres for next year. On Mr. Payne's property some really good Badila was also seen, good stools with a heavy barrel. His density returns from samples sent to Proserpine Mill were:—

Gorus (ratoons), 16.8 c.c.s.

H.Q. 426 (plant), 16.5 c.c.s., November planting.

Badila (plant), 15.2 c.c.s., May planting.

Quite a number of the Bowen growers expressed their intention of increasing their areas. The Proserpine mill has erected a couple of fine derricks at the Don and Delta sidings for the convenience of farmers. Liming and manuring are receiving attention, as it is recognised that on small areas it will pay to get the best results possible.

Proserpine.—This area was also found to be suffering from the dry weather, as the rainfall for the seven months ending 31st July amounted only to 34.63 inches. Generally speaking, this year's crop will be a slight one, mainly on account of too much continuous wet weather last year and a shortage of rain in the growing period of this year, the result being that the autumn plant cane has not made the growth that it should have, and the ratoons are also very backward. The outstanding feature is certainly the very large area that is being planted for next year. In every part of the area this activity was most noticeable. With all the unused land in the Proserpine area, the local mill should be crushing a great deal more cane. The Torvale Estate has now some 70 acres, and Messrs. Phaff Bros. are just completing 50 acres.

The principal canes grown in this district so far are the Gorus (N.G. 24, 24 A, 24 B), Clark's Seedling (H.Q. 426), Malagache, Badila, with smaller quantities of D. 1135, Striped Singapore, M. 1900, and the newer varieties such as E.K. 1, Q. 813, Q. 855, Q. 903, Q. 1121, and Q. 116. Of these, H.Q. 426 is still a great favourite here and the cane now being crushed certainly justifies its popularity. Q. 813 also gave very fine average results in density last season, being second only to H.Q. 426. The latter's average was 14.5 c.c.s., whilst Q. 813 was 14.25 c.c.s.

A large proportion of the cane planted out this year will certainly be Q. 813.

Pests.—Proserpine district is, so far, fairly free from pests. A few borers were noticed in isolated places, and grubs have caused damage to a limited extent on Kelsey Creek, Cannon Valley, and Strathdiekie. On the latter place Messrs. Redhead Bros. are still using dressings of arsenic on their plant cane.

Practically no grubs were in the areas so treated last year, but in one place this season the resultant first ratoons, which were volunteered and had no further dressing of poison, show a few grubs in one corner.

Far more liming and fertilising is now being carried on than formerly in the district, and the growers seem quite alive to the importance of this practice. Cane was coming in to the mill from Cannon Valley—mostly mountain-side grown.

Mr. J. Smith was cutting a fine crop of Badila that will probably return him a 40-ton crop per acre, and its density is 16 c.c.s. This crop was grown upon a rough and rocky hillside, and it says much for the owner's energy in planting and harvesting cane under such arduous conditions.

Another grower who is also growing upon a very rough hillside is Mr. Altmann. He was cutting a heavy crop of Striped Singapore, which, though cropping very well, was not too high in density.

Another farmer who is growing upon very rough ground and also has a very long and rough haul to the tramway is Mr. W. Hallam. If the advocates of cheap sugar had to grow cane under such hard conditions, their ideas might possibly alter.

Most of this hillside land is a dark volcanic chocolate and heavily studded with rocks.

On some of the lower-lying ground Q. 813 is doing very well, one gentleman getting 16 c.c.s. off some 10-months-old plant cane. Again referring to the quality of the cane now being crushed, the general average is about 15 c.c.s. H.Q. 426 is again giving some fine returns, one grower's average to date being 16.9 c.c.s. for plant cane. Q. 813 is running a good second, as one farmer's average for this cane is 16.1 c.c.s. M. 1900 also is very good, and only a shade behind Q. 813 in quality.

Whilst visiting the district some very cold weather was experienced, and this and the very dry spell were not conducive to the young plant-cane making headway. With a fall of a few inches and some warm weather, the prospects for 1923 would be very much improved.

NEW SUGAR DISTRICTS.

BAMBAROO AND YURUGA.

The Director of the Bureau of Sugar Experiment Stations has received the following report dated 8th September, 1922, on new sugar-cane districts between Ingham and Townsville, from the Northern Field Assistant, Mr. E. H. Osborn:—

Bambaroo and Yuruga.—At the time of my visit, the conditions were found to be exceedingly dry. The total rainfall for the year had been only 34.59 inches. In the same period Ingham had 60.36 inches, and, naturally, under such dry conditions the growth of the cane was very backward.

Unfortunately, rainfall figures have not been kept for any length of time, and I was only able to obtain those relating to 1920 and 1921. These were 99.27 inches and 57.36 inches respectively, or an average of 78.31 inches for the period. Although the cane had made poor growth the density returns were very good, as the following figures show:—

A parcel of mixed Badila and H.Q. 426 (Clark's Seedling) from Mr. Hecht's farm went 17.45 c.c.s., and a nine-months-old plant crop of H.Q. 426 from Mr. D. Ross's place gave 15.90 c.c.s.

On Mr. Layton's place some H.Q. 426 ratoons with a few rows of Badila ratoons gave him an average of 16 c.c.s., and a tonnage of about 18 tons per acre. As a plant crop, he cut at the rate of 30 tons per acre, with an average density of 16 c.c.s. On Mr. Toale's farm a very heavy crop of Badila, going probably about 55 tons per acre, was being cut. This was growing upon a rich patch of dark scrub loam. The cane had been planted 15 months previously.

Some twenty-six farmers, with an acreage of about 208 acres, are supplying the Haughton Valley Mill from the siding between Rollingstone and Toobanna, and with good planting weather this number should be increased to about forty next year. Early in the season a tonnage of over 3,000 tons was expected in this locality, but the bad weather conditions have made these figures subject to a big reduction.

The areas visited were those adjacent to Bambaroo and Yuruga, or, roughly speaking, comprising the land on Waterfall and Waterview Creeks. These two creeks run from west to east across the railway line, which about here runs from south to north, and most of the cane land is upon the western side of the line and follows the course of these two creeks. The greater part of the land seen was either a fairly shallow, sandy, forest loam with about an average depth of 9 inches, or a darker and deeper forest loam that would probably average a couple of feet. The hills from which the creeks rise are mostly of granite formation. The country generally is very heavily timbered with Moreton Bay, blue and poplar gum, and a lot of bloodwood, whilst patches of acacia are found upon the heavier and deeper soils. Nearly all the farms visited consisted of very small patches of cane, the largest being Mr. Holland's, on Waterview Creek. He now has about 17 acres under cane, and hopes to plant another 20 in the near future. His area contains some very good land and is capable of considerable crop extension.

The light and shallow forest soils are capable of growing fair crops of high density cane, subject to good cultivation methods, but will require manuring fairly soon. The darker and deeper class of ground is capable of giving good cane returns for a considerable period, but will also benefit by being manured.

Although canegrowing is a new departure here, the residents are putting a good deal of energy into it. A small sawmill has also been installed at Bambaroo, and is engaged in cutting up tramway material for the Haughton Valley Mill.

PAPER MULCHING OF PINEAPPLES.

By A. T. LONGLEY, Board of Agriculture, Honolulu.

In consequence of the interest evinced by a large number of pineapple-growers in the Hawaiian method of growing pines under paper, which was noted in a recent "Journal," further information was sought. An opportunity of obtaining fuller knowledge presented itself when representatives of the Hawaiian Pineapple Company (Messrs. Barnes and W. H. McInerny) visited Brisbane in June last. Through the courtesy of these gentlemen we are now able to publish the full text of the article from an abstract of which our reference was taken.

A few years ago Mr. C. F. Eckart introduced a paper mulch for use in the production of sugar-cane, which is being used with great success in Hawaii. Mr. Eckart's patent rights covering paper mulch also include its use in the production of pineapples and various other crops. No experiments had been made with pineapples, however, until 1919, when an experiment was planted in roofing paper by the Hawaiian Pineapple Company, Ltd., after Mr. Whitmore had seen the mulch in use on cane in Olaa. As a result of the excellent showing made by paper mulch in this and more recent experiments on both upper and lower lands, the Hawaiian Pineapple Company has acquired an option on all patent rights for growing pineapples in paper mulch. It is estimated that there are at present 461 acres planted in paper, 68 acres of which will fruit in 1922. The Hawaiian Pineapple Company has 431 acres, Libby, McNeill, and Libby 25 acres, and the California Packing Corporation 5 acres.

The first yields were obtained from paper-mulch plantings during the past season. These yields and the appearance of all paper-covered plantings, ranging from a few months to two years old, leave little doubt as to the value of the paper. Plants in paper grow uniformly larger, greener, and healthier, and produce larger fruit than plants grown without paper. The fruit maturing on paper mulch last season was very carefully weighed, as was that on adjoining check lines, and the results showed an average weight of 4 lb. 8.24 oz. for the fruit grown with paper, while that grown without paper averaged only 3 lb. 8.66 oz.; a difference of nearly 1 lb. Allowing 7,300 fruiting plants to the acre, this shows an increase of 7,107.2 lb., or a little over 3½ tons in favour of the paper.

As the plants on paper were in much better condition after the fruit was harvested than those grown without paper, it is believed that the first ratoon crop will show at least as great an increase as the plant crop, and that the second ratoon crop will also show a substantial gain. It is not improbable that the total increase will amount to 8 or 9 tons for the three crops, and that an additional ratoon may be grown at a good profit in many fields. Had the entire field in which the experiment was conducted been planted with paper mulch and yielded at the same rate as the experiment, the production would have been 23.3 per cent. greater. From the appearance of plants in paper mulch on the better lands which will bear next year, there is reason to believe that this high percentage of increase will be maintained or even bettered. The experiments being conducted by the California Packing Corporation (Libby, McNeill, and Libby) and the Hawaiian Pineapple Company cover a wide range of soil and climatic conditions, and in every case show a decided improvement from the use of paper. In all experiments where the plants have been growing a few months, the exact boundaries of the paper-covered lines can be established from a great distance by the increased growth and healthier colour of the plants.

While the greatly increased yield is the most important benefit derived from the use of paper mulch, it has many good points that recommend it. While no account has been kept of weeding costs, it is conservatively estimated that paper mulch will save two-thirds of this expense. The space around the plants which ordinarily takes the most time needs no hoeing, and the weeds between the lines can be fairly well controlled by cultivating. In addition to cutting labour costs to a minimum, it prevents the growth of weeds between the plants during long wet spells. Fertilising costs are also lowered, as it is not necessary to feed the weeds. It is expected that the saving in weeding costs for two years will pay for the greater part of the material and labour for applying the paper.

Paper mulch also prevents hard rains from packing the soil around the roots of young plants, and in dry weather keeps the plant-food more available by holding the moisture in the soil, where under ordinary conditions it would dry out and bake. Tests made during the hot, dry weather showed approximately double the amount of moisture in soil under paper as in soil without paper. At the same time,

temperature tests were made with and without paper mulch, which showed the soil under paper to be warmer by from 2 to 5 degrees, depending on the quality of the paper, and also showed a minimum ranging from 2 to 6 degrees higher at night. The temperatures were taken under several different makes of paper with recording thermometers such as are used in the canneries.

After successful experiments had been carried on by the Hawaiian Pineapple Company and others at Wahiawa, the Hawaiian Pineapple Association's experiment station planted an experiment in April of this year (1921) at Kailua, Oahu, which shows conclusively that paper mulch is far better for that section than any of the other fifty plots which were treated with various chemicals. The plant growth on the paper mulch is at least three times greater in weight and much healthier than other plots, only two plants out of 129 showing the least signs of weakness. Practically all plants in the chemically treated and check plots are small, weak, and of poor colour. There has been practically no rain at the experiment since it was planted, yet the soil under the paper has been kept in a moist and friable condition throughout, even when no signs of moisture could be found to a depth of 18 inches in other plots. Especially interesting is the fact that a plot of approximately 10 by 15 feet entirely covered with roofing paper shows even better plants than the adjoining plot, where only the lines were covered. The soil under the middle of this plot was apparently as moist and loamy as under the other. It is evident that it would be impracticable to put paper over a whole field, even though it were not necessary to cultivate. Space must be left for drainage and for the men in harvesting. If it is true that the control of moisture and temperature are factors in checking what is known as wilt, paper mulch may be the remedy.

The best and cheapest method of applying the paper, so far as known, is by hand. After the land has been properly prepared for planting, a sled is dragged along the slightly raised line, breaking lumps, smoothing the surface, and bevelling the sides slightly. The paper, which comes in rolls of about 500 square feet each, is fastened at the end of the line by putting some soil on it. A man, with an adjustable handle which fits in both ends of the roll, backs along the line, unrolling the paper. As the paper is unrolled a man on either side of the paper puts on enough soil with a hoe to keep the wind from tearing it until a small plow can throw a small amount of soil along both edges. Care should be taken, however, not to get too much soil on the paper, and it is sometimes desirable to have a man follow the plough with a broom to sweep off any excess. There should be a gentle slope from the centre of the line towards the edges of the paper in order that the water may run off quickly instead of standing in depressions between the plants. A crew of four experienced men can lay paper for \$3.00 an acre or less. This figure will be reduced somewhat when the paper is cut in 300-foot lengths to fit the standard lines, instead of the 110 to 170-foot lengths, as at present, which necessitate an extra man in the laying crew to carry the rolls of paper from the field road towards the centre of the line.

An ideal paper mulch for pineapples should have the following qualities:—It should be 300 feet long, at least 36 inches wide for double lines, strong enough to withstand the weather for at least two years without shrinking or tearing, or rotting out on the edges where it is necessary to put the soil to hold it in place. It should also be waterproof and of good insulating qualities to hold the heat and moisture around the roots. In order to determine the relative values of different makes and qualities of paper for use in the production of pineapples, a comparative experiment was planted by the Hawaiian Pineapple Company on 3rd September, 1921, containing ten kinds of building, insulating, and specially made papers. The papers being tested are all 36 inches wide, but vary in length from 110 to 300 feet to the roll, in weight from 5 to 14 lb. per 100 square feet, and range in cost from \$40.00 to \$244.00 per acre. A close check is being kept on these different papers to see how they stand the weather, and careful records will be kept of the yields. At this early date it would appear that one of the cheaper papers will be the best adapted for pineapple culture.

THE DAIRY HERD, QUEENSLAND AGRICULTURAL COLLEGE, GATTON.

MILKING RECORDS FOR AUGUST, 1922.

Name of Cow.	Breed.	Date of Calving.	Total Milk.	Test.	Commercial Butter.	Remarks.
			lb.	%	lb.	
Miss Fearless ...	Ayrshire ...	30 May, 1922	660	4.5	35.10	
Hedges Nattie ...	Friesian ...	20 May, "	690	3.8	30.90	
Dawn of Warragaburra	Jersey ...	17 May, "	480	5.2	29.40	
Songstress ...	Ayrshire ...	4 July, "	750	3.3	28.80	
Confidence ...	" ...	13 Aug., "	551	4.0	25.65	
Netherton Belle ...	" ...	19 July, "	510	4.1	24.60	
Dear Lassie ...	" ...	19 June, "	600	3.5	24.30	
College Cold Iron	Jersey ...	25 Jan., "	390	5.3	24.30	
Gay Lassie ...	Ayrshire ...	20 Feb., "	420	4.8	23.70	
Prim ...	Friesian ...	6 Feb., "	660	3.1	23.70	
Little Buttercup...	" ...	12 Dec., 1921	600	3.4	23.70	
La Hurette Hope	Jersey ...	30 June, 1922	450	4.4	23.10	
Snowflake ...	Shorthorn...	20 Feb., "	510	3.8	22.80	
Lute ...	Ayrshire ...	8 Jan., "	480	4.0	22.20	
Magnet's Leda ...	Jersey ...	8 Feb., "	450	4.2	22.20	
Miss Betty ...	" ...	17 May, "	420	4.4	21.60	
Sheila of Nundorah	Guernsey ...	6 April, "	360	5.0	21.00	
College Cobalt ...	Jersey ...	3 April, "	390	4.6	21.00	
College La Cigale	" ...	10 July, "	420	4.3	21.00	
College St. Margaret	" ...	16 June, "	360	4.8	20.10	
Lady Annette ...	Ayrshire ...	2 Jan., "	360	4.8	20.10	

REPORT ON EGG-LAYING COMPETITION, QUEENSLAND AGRICULTURAL COLLEGE, AUGUST, 1922.

The month of August has been favourable for egg production. In the light breed section, Mr. N. A. Singer's six pullets laid the highest monthly total of 169, his "B" bird completing a total of 48 eggs before breaking off. Mr. C. H. Singer is next with a total of 156. In the heavy section Mr. R. Burns comes first with a total of 152 for the month, followed by Mr. Hindley with 145. The weighing of eggs is not quite completed, but it is pleasing to note the fine average size of eggs laid by the competitors. From present appearances it is thought that very few pens will fail to secure the full weight. One bird died during the month, the cause of death being bowel trouble. The following are the individual records:—

Competitors.	Breed.	August.	Total.
--------------	--------	---------	--------

LIGHT BREEDS.

*N. A. Singer ...	White Leghorns	169	580
C. H. Singer ...	Do.	156	548
*W. and G. W. Hindes	Do.	130	546
*Bathurst Poultry Farm	Do.	116	488
*W. A. Wilson	Do.	131	459
*T. Fanning ...	Do.	123	455
J. H. Jones ...	Do.	125	453
*G. Trapp ...	Do.	121	453

EGG-LAYING COMPETITION—*continued.*

Competitors.	Breed.	August.	Total.
LIGHT BREEDS— <i>continued.</i>			
*Mrs. L. Andersen ...	White Leghorns ...	126	445
*S. L. Grenier ...	Do. ...	133	443
A. C. G. Wenck ...	Do. ...	123	440
*R. Gill ...	Do. ...	137	428
*W. Becker ...	Do. ...	124	427
*J. M. Manson ...	Do. ...	131	423
*H. P. Clarke ...	Do. ...	131	422
B. Hawkins ...	Do. ...	126	417
*G. Williams ...	Do. ...	118	415
*O. Goos ...	Do. ...	122	415
J. Purnell ...	Do. ...	125	410
*J. W. Newton ...	Do. ...	134	402
A. Maslin ...	Do. ...	123	402
*R. C. Cole ...	Do. ...	123	395
*Harold Fraser ...	Do. ...	114	385
*C. Goos ...	Do. ...	128	383
*Oakleigh Poultry Farm ...	Do. ...	127	369
*Mrs. E. White ...	Do. ...	98	369
*Mrs. R. E. Hodge ...	Do. ...	132	364
T. H. Craig ...	Do. ...	115	357
*J. W. Short ...	Do. ...	122	356
*M. F. Newberry ...	Do. ...	115	351
*Thos. Taylor ...	Do. ...	127	349
G. F. Richardson ...	Do. ...	103	343
*C. M. Pickering ...	Do. ...	107	340
*R. C. J. Turner ...	Do. ...	126	339
W. J. Nairn ...	Do. ...	116	338
*F. Birchall ...	Do. ...	107	333
E. Stephenson ...	Do. ...	101	331
*E. A. Smith ...	Do. ...	110	321
B. C. Bartlem ...	Do. ...	100	320
E. Symons ...	Do. ...	114	317
A. Anders ...	Do. ...	104	282
Brampton Poultry Farm ...	Do. ...	113	271
H. Trappett ...	Do. ...	109	241
Parisian Poultry Farm ...	Brown Leghorns ...	86	110

HEAVY BREEDS.

*A. E. Walters ...	Black Orpingtons ...	127	513
*R. Burns ...	Do. ...	152	493
*R. Holmes ...	Do. ...	129	481
*H. M. Chaille ...	Do. ...	134	473
*T. Hindley ...	Do. ...	145	473
Jas. Hutton ...	Do. ...	125	455
Mrs. A. Kent ...	Do. ...	126	453
Wambo Poultry Farm ...	Do. ...	114	429
*C. C. Dennis ...	Do. ...	139	404
*E. F. Dennis ...	Do. ...	118	397
*Jas. Potter ...	Do. ...	127	385
Mrs. A. E. Gallagher ...	Do. ...	127	385
*Rev. A. McAllister ...	Do. ...	98	377
R. Innes ...	Do. ...	136	367
Mrs. L. Maund ...	Do. ...	116	356
V. J. Rye ...	Do. ...	135	347
C. Doan ...	Do. ...	128	336
Jas. Hitchcock ...	Do. ...	129	328
H. B. Stephens ...	Do. ...	127	313
*Parisian Poultry Farm ...	Do. ...	136	302

EGG-LAYING COMPETITION—*continued.*

Competitors.					Breed.	August.	Total.
HEAVY BREEDS— <i>continued.</i>							
W. Becker	...	...	...	...	Chinese Langshans	124	302
C. Rosenthal	...	...	...	...	Black Orpingtons	104	285
W. C. Trapp	...	...	...	...	Do.	116	267
R. Burns	...	...	...	...	Silver-laced Wyandottes	136	219
*J. E. Smith	...	...	...	...	Plymouth Rocks	109	193
*Miss L. Hart	...	...	...	...	Rhode Island Reds	69	75
Total	...	...	...	...	...	8,547	26,443

* Indicates that the pen is being single tested.

DETAILS OF SINGLE HEN PENS.

Competitors.	A.	B.	C.	D.	E.	F.	Total.
--------------	----	----	----	----	----	----	--------

LIGHT BREEDS.

N. A. Singer	..	..	..	83	112	89	99	97	100	580
W. and G. W. Hindes	..	..	..	101	85	94	88	99	79	546
Bathurst Poultry Farm	..	..	..	66	66	86	94	101	75	488
W. A. Wilson	..	..	..	74	69	61	91	76	88	459
T. Fanning	..	..	..	53	98	84	88	101	31	455
Geo. Trapp	..	..	..	87	62	67	86	74	77	453
Mrs. L. Andersen	..	..	..	92	53	80	75	68	77	445
S. L. Grenier	..	..	..	72	45	80	80	81	85	443
R. Gill	..	..	..	81	78	87	66	52	64	428
W. Becker	..	..	..	67	44	84	69	75	88	427
J. M. Manson	..	..	..	71	57	82	57	82	74	423
H. P. Clarke	..	..	..	75	55	73	80	73	66	422
G. Williams	..	..	..	64	73	79	70	67	62	415
O. Goos	..	..	..	69	51	80	89	75	51	415
J. W. Newton	..	..	..	87	67	79	49	74	46	402
R. C. Cole	..	..	..	76	76	77	37	65	64	395
H. Fraser	..	..	..	68	77	62	57	53	68	385
C. Goos	..	..	..	48	52	48	75	89	71	383
Oakleigh Poultry Farm	..	..	..	74	51	68	54	51	71	369
Mrs. E. White	..	..	..	82	11	70	45	83	78	369
Mrs. R. Hodge	..	..	..	85	34	53	60	75	52	364
J. W. Short	..	..	..	60	64	73	49	42	68	356
M. F. Newberry	..	..	..	62	34	48	89	46	72	351
Thos. Taylor	..	..	..	77	45	63	60	60	44	349
C M. Pickering	..	..	..	77	72	40	54	58	39	340
R. C. J. Turner	..	..	..	60	46	71	66	62	34	339
F. Birchall	..	..	..	56	64	32	39	73	69	333
E. A. Smith	..	..	..	70	43	72	63	34	30	321

HEAVY BREEDS.

A. E. Walters	..	..	..	84	81	75	82	97	94	513
R. Burns	..	..	..	74	87	68	92	87	85	493
R. Holmes	..	..	..	61	100	81	81	74	84	481
H. M. Chaille	..	..	..	99	70	88	82	82	52	473
T. Hindley	..	..	..	58	82	49	116	113	55	473
C. C. Dennis	..	..	..	66	79	71	60	71	57	404
E. F. Dennis	..	..	..	73	65	85	17	73	84	397
J. Potter	..	..	..	59	70	76	64	78	38	385
Rev. A. McAllister	..	..	..	73	81	94	39	11	79	377
Parisian Poultry Farm	..	..	..	35	57	60	31	60	59	302
J. E. Smith	..	..	..	15	41	30	26	40	41	193
Miss L. Hart	..	..	..	12	18	9	21	0	15	75

CUTHBERT POTTS, Principal.

THE PHYSIOGRAPHY OF NORTH AUSTRALIA—II.

By DR. H. I. JENSEN, Geological Survey, Brisbane.

The first instalment of these notes, descriptive of the physiography of the Northern Territory, was published in the September Journal.

NORTH QUEENSLAND.

North Queensland is a peneplain elevated in the post-Cretaceous periods. The maximum elevation has been along the east coast. Elevation has been alternating with subsidence in the Gulf country, but the present tendency is for the land to gain on the sea principally through alluviation. Actual elevation is but slight, as shown by the Gulf rivers within Queensland, which are not cutting down their channels, but run for hundreds of miles before entering the sea as shallow, wide watercourses filled with sand.

North Queensland has been a continental area, or an area affected only by isostatic earth movements since the Carboniferous.

Mesas of Permo-Carboniferous sandstone lying almost horizontal survive at Mount Mulligan, between the Walsh and Mitchell Rivers and in the peninsular west of Cooktown. These are often almost conformably overlain by Jurassic rocks, and extensive flat-tops of Jurassic Sandstone are also scattered through North Queensland. These were formerly known as Desert Sandstone, but that term is now practically obsolete as a geological horizon.

Laterites occur extensively in North Queensland as disjointed cappings on tablelands, but are disintegrating, which is evidence of the climate getting wetter.

Great areas of North Queensland have been faulted down along the Pacific Coast in Tertiary times, and are now under the Barrier Reef.

The North of Queensland is from the physiographic standpoint divisible into three divisions:—

- (a) The Pacific Slopes, with high rainfall, rich soils, and rough topography;
- (b) The Mountainous Mining Belt, with poor soil, medium rainfall, rough barren topography, and very rapid drainage;
- (c) The Gulf Country, which is roughly divisible into the same zones as the Northern Territory and has the same characters.

To (a) Division belong the Cairns, Atherton, Herberton, and Cooktown districts. The Hodgkinson, Irvinebank, Featherbed, and Chillagoe belts belong to (b) division, and the Einasleigh and Croydon districts belong to (c) division.

I append notes which I have made on the physiography of each of these districts.

The Pacific Slopes of North and Central Queensland are a subsiding area, but south of Great Sandy Island the coast is rising, especially around Moreton Bay.

The drying-up of swamps from natural causes has been noticed in active progress. Several areas of melaleuca swamp in the East Moreton (South Queensland), have in the last twenty years become dry Casuarina country.

REVIEW OF INDIVIDUAL DISTRICTS.

The CAIRNS COASTAL BELT.

Taking this to mean the strip of country lying between the Barron River on the north, and the Herbert River on the south, the sea on the east, and the Atherton-Herberton tablelands on the west, the following is a brief resumé of its characteristic features:—

Physiography.—The belt is rugged in the extreme. High mountains rise abruptly from the very seashore or from a narrow alluvial coastal plain. Here and there disconnected outliers of the coastal range stand forth as conical peaks. Mt. Bellenden Ker, one of the peaks on the range itself, is the highest mountain in Queensland, although it is only a few miles from the coast.

Soils.—At the foot of the coastal range, rock waste from the denudation of these high mountains is accumulated to a great depth. Being derived from a variety of formations ranging from acid igneous rocks, like granite and rhyolite, and silicious slates, to basic igneous and metamorphic rocks, like basalt and amphibolite, the soils of the coastal plain are loamy and rich in plant food, yielding the excellent sugar lands for which the district is justly famed.

Rainfall.—The rainfall of the district is very high. Thus Geraldton, on the Johnstone River, over a period of twenty-two years has had an average annual rainfall of 145.71 inches, most of which falls in the months from December to March inclusive (Commonwealth Meteorological Bulletin No. 4.). The average annual rainfall of Cairns was given as 91.3 inches. During the dry-season months this belt receives light rains, known as "scrub rains," which are very beneficial to agriculture. There is a danger that if all the mountain scrubs be cleared these scrub rains will cease, and the fertility of the district would thus be greatly diminished.

Forests and Timbers.—As a result of rich soil and a damp climate, dense scrubs covered all the best of the country in its virgin state. In these scrubs flourished numerous species of pine, maple, cedar, mahogany, and other valuable timbers, which are being rapidly cut out without any thought of the future. On the less fertile soils the dominant forest flora consists of the usual tropical eucalypts, melaleucas (tea-trees) and acacias (wattles). Along the sea frontages and estuaries there are great mangrove jungles of future prospective value for the high tannin in the mangrove bark, and the considerable potash percentage in the ashes of the wood of the mangrove.

Sugar, cotton, coffee, rice, and most other tropical productions do well in the district. Citrus fruits and all tropical fruits grow luxuriantly on the talus soils at the foot of the hills. Apples, pears, and cherries will grow on the Herberton Tableland.

THE KANGAROO HILLS DISTRICT.

Physiography.—This district consists of rugged mountains and ravines. The ranges and tablelands, which often exceed 2,000 feet in altitude, are built up of granitic and metamorphic rocks, here and there broken through by and capped with basalt of late Tertiary age, as at Mt. Fox, a quite recent basalt cone.

Soils.—The basaltic soils are good, but by far the largest area of the district has only very poor silicious soils.

Rainfall.—On the coastal plain at Halifax and Ingham the rainfall is heavy, but on the Kangaroo Hills it is comparatively low, averaging about 25 inches per annum, practically the whole of which falls in the wet-season months. For this reason even the basaltic soils constitute mainly forest country, scrubs being confined to the eastern slopes and a few moist gullies.

Timbers.—Spotted gum (*E. maculata*) woolly butt (*E. miniata*), ironbark (*E. melanophloia*), and bloodwood (*E. terminalis*) are the principal forest timbers on the hills. On the granite areas the dominant timbers were *Eucalyptus grandifolia*, *E. alba*, and in moist places *E. papuana*; on the metamorphics, ironbark (*E. crebra*) predominates, on the basalt around Mt. Fox, bloodwood (*E. corymbosa*, *E. terminalis*), box (*E. microtheca*) and blue gum abound, while on the desert sandstone we have abundant yellow-jacket (*E. trachyphloia*), ironbark, setose gum (*E. setosa*), wattle, and stunted bloodwood.

COOKTOWN DISTRICT AND BACK COUNTRY.

Physiography.—Owing to the heterogeneous geological formations of this area, there are great variations of soil and climate. The immediate vicinity of Cooktown consists of high hills of granite and slate formation rising out of a narrow coastal plain consisting of the same rocks. Extensive alluviated flats cover the interspaces between the hills, and where these are periodically flooded by salt water from the Endeavour River, mangrove jungles constitute a physiographic feature.

Not more than 20 miles inland, following the railway line, we enter a low tableland from 300 to 600 feet high, built up of sandstones. Westwards this tableland extends nearly to Maytown, gaining an altitude of over 1,400 feet.

Rainfall.—The rainfall at Cooktown averages nearly 65 inches per annum, mostly wet-season rains, but on the sandstone tableland the average is probably only 40 inches.

Soils.—The soils of the district, being derived from acidic rocks, mainly are very poor. Some of the alluvial flats near Cooktown are fair, but the granite and slate soils are very mediocre. The sandstone soils further west are exceedingly bad, and neither suitable for cultivation or for pastoral pursuits.

Vegetation.—The granite slate soils near Cooktown have the usual tropical eucalypt flora (*E. papuana*, *E. grandifolia*, *E. terminalis* (bloodwood); *E. alba*, *E. tetradonta*, *E. crebra* (ironbark); and ironwood (*Erythrophloeum*). The sandstone soils have only stunted gums, tea-tree (melaleuca and leptospermum species), hakeas, grevilleas, and a few acacia species. Bastard bloodwood (*E. latifolia* ? or *E. dichromophloia*) and ironbark (*E. crebra*) occur on a few conglomerate areas. Commercial

sandalwood occurs widely spread throughout the district on alluvial flats. It is one of the main products of the district to-day. The timbers observed to be most abundant on the Little Laura sandstones were stringybark (*E. tetradonta*), bloodwood (*E. terminalis* or *E. Abergiana*), bastard bloodwood (*E. latifolia* ?), ironwood, gum (*E. grandifolia*, also called erroneously Moreton Bay Ash), hakeas, wattles, grevilleas, capoc tree, and gardenia, with pandanus and tea-tree on the river banks.

ATHERTON-HERBERTON TABLELANDS.

Physiography.—We may regard as one physiographic unit all that strip of hinterland which is in part scrub-covered on the basaltic and slate areas. This type of country extends from Mt. Molloy, through Atherton, to Ravenshoe. The southern portion of the area is further divisible into the Barron upland plain and the Herberton tablelands. The Barron Valley has an elevation of 1,325 feet at Mareeba, and 2,466 feet at Atherton. The Herberton-Ravenshoe tableland is a step higher, averaging 2,900 to 3,000 feet. The area is rough in places, as on the eastern slopes of the Herberton plateau and in the Tinaroo Hills, but there are considerable areas of plain country representing late Tertiary basalt flows.

Rainfall.—The distribution of the rainfall is somewhat uneven, owing to the varied topography of the district. Those subdivisions of the tablelands, which are very rough and mountainous, get a higher rainfall than the more level areas, and the scrubs get scrub rains which often do not extend beyond the edge of the scrubs. The average annual rainfall is somewhere about 50 inches for the whole district. At Mareeba it is somewhat lower because the Dimbula granite area extends eastwards almost to the Barron Falls, and weathers evenly, yielding gently undulating country with poor soil. This area, therefore, approaches the Featherbed area in climate.

Soils.—The soils on the basalts are deep and rich, forming the excellent dairying lands of the Atherton and Ravenshoe districts. The granites have poor soils. Most of the metamorphic rocks yield poor soils also, but some, chiefly the amphibolite schists, yield very good soils. The basalt soils were scrub covered in the virgin state, except around Mareeba, where the inland type of climate prevails. The Barron plain is a broad valley infilled with basalt, which yields rich scrub soils. A large portion of the Herbert Valley is similarly basalt flooded, yielding a rich agricultural area.

The sudden steep fall of the coastal range to the east, and the occurrence of what seem to be Devonian rocks on the coastal plain, point to the presence of a big fault immediately east of the Tinaroo Hills.

Timbers.—The scrubs contain a varied flora, largely softwoods, including pine, cedar, maple, beech, and other valuable timbers. The forest country exhibits the usual relationship between geological formation and forest flora.

On the granites, box (*E. microtheca*), poplar gum (*E. alba*), and on moist flats river gum (*E. Tereticornis*) dominate; on diorite, bloodwood and ironbark; on the greissen, bloodwood (*E. terminalis* ?); and on the metamorphic rocks, ironbarks (*E. crebra* or *E. leptophleba*) and gum (lemon scented, *E. citriodora* ?). In the Herberton district stringybark is also fairly plentiful on poor soils, both of granite and metamorphic origin.

IRVINEBANK-EMUFORD AREA.

Physiography.—This rich mineral district is situated west of the Herberton district, and extends west as far as the Mount Garnet railway north to the Chillagoe railway. Irvinebank is in the centre. The area consists mainly of rocks of the Herbertonian series (Ordovician?).

The district is very rugged and mountainous, and in most places exceeds 2,500 feet in elevation.

The rocks most frequently met with are greywackes and chlorite schists, with some slates, quartzites, and phyllites, all intruded extensively by porphyries of the Featherbed type and by later granites with their dyke retinue.

Rainfall.—The rainfall at Irvinebank averages about 43 inches per annum. Most of it falls in the wet-season months.

Soils.—The soils of the district are mostly poor.

Vegetation.—Since the soils are poor and the rainfall is confined mainly to the wet season, there are no scrubs in this district.

On the arkose-like greywackes of the district, as near Mount Albion, we have a yellow-jacket (*E. Trachyphloia* ?); on lode formations a gum-topped bloodwood known as "Dead Finish" is common (*E. Cloeziana* ?). On the granite country between Irvinebank and Stannary Hills we have broad-leaved ironbark (*E. melanophloia*), scented gum (*E. citriodora* ?), and pine. On the Featherbed porphyry rocks the narrow-leaved ironbark is the commonest tree, but on associated tuffs and more basic porphyries we also get lemon-scented gum, broad-leaved ironbark box (*E. leptophleba*), and pine. On the slates and schists, the scented gum, white gum (*E. pallidifolia* ?), narrow-leaved ironbark (*E. crebra*), and bloodwood are common. Poplar gum (*E. alba*) is also a common form on the porphyry country.

FEATHERBED RANGE.

Physiography.—This district is very mountainous and rugged. The rocks are of the same types as those of the Irvinebank area, but the porphyries predominate to such an extent that the district is very much more barren than its neighbour to the south. The elevation ranges from 1,500 to 2,500 feet.

Rainfall.—The average rainfall is about 36 inches per annum, practically all wet-season rains.

Vegetation.—On the porphyries between Boon-Moo and Petford, narrow-leaf ironbark is characteristic on the slopes and poplar gum (*E. alba*) on the flats. Where the porphyries are syenitic, bloodwood also comes in. Scented gum occurs in scattered places on tuffs and metamorphics where the depth of soil is sufficient.

On the acid granites near Lappa, silver-leaved ironbark (*E. melanophloia* ?), bloodwood (*E. latifolia* ?), pine (*Callitris*), capoc (*bombax*), hakea (beefwood), quinine (*petalostigma quadriloculare*), grevillea, gum or ash (*E. grandifolia*) are the commonest woods. On the more basic rocks ironwood (*erythrophloia*), bloodwood (*E. latifolia*), narrow-leaved ironbark (*E. crebra*).

Soils.—The soils are exceedingly poor. The district is useless but for mining, and consequently contains only a few mining camps, including Bamford, Wolfram, Lappa, and Koorboora.

[TO BE CONTINUED.]

A SUMMARY OF SOME EXPERIMENTS CARRIED OUT BY THE BUREAU OF SUGAR EXPERIMENT STATIONS—V.

By H. T. EASTERBY, Director.

The first article of this series, in the course of which Mr. Easterby discussed deep cultivation experiments and tabulated comparative crop results from subsoiled and non-subsoiled fields, was published in the May Journal. The second instalment, an account of the results of irrigation experiments and the action of irrigation and manures upon the density and purity of sugar juices, appeared in the June issue. The third instalment, treating of experiments in fertilisation, was published in the August issue; and last month's journal contained an account of distance experiments and resultant crops.—Ed.

(A)—INTRODUCTION AND TESTING OF CANE VARIETIES.

One of the principal objects of the Experiment Stations is the constant introduction of new varieties, and their commercial testing. Before any cane varieties are allowed to leave the Experiment Stations they have to pass chemical and commercial

trials through plant, first ratoon, and second ratoon crops. Each variety is tested not less than four times during the sugar season, so that records are obtained giving farmers and millowners information as to whether canes are early or late, and as to whether their sugar contents are sufficiently high to warrant their adoption. This is combined with agricultural trials on the field, so that it may be determined whether such varieties are good croppers. They are further rigorously watched for evidence of disease, and no affected canes are allowed to go into distribution. When varieties have passed these trials they are carefully examined and packed before being sent to growers living at a distance from the Stations. Farmers close at hand are invited to visit the Stations and remove the varieties selected for distribution. The worthless varieties are discarded. Information of this kind could only be secured by growers and millers at the expense of much time and money and the rejection of many useless canes by the mills, which would be accompanied by severe loss to the growers.

It is proposed in this article to shortly summarise the introduction of the different varieties introduced by the Department of Agriculture and the Sugar Experiment Stations, with the ultimate results.

1895 TO 1904.

During this period 110 varieties of cane were introduced upon the Mackay Sugar Experiment Station, of which—

12 were collected in New Guinea by Mr. Cowley.

74 were collected in New Guinea by Mr. Tryon.

8 were introduced from Mauritius.

4 were introduced from Hawaii.

4 were introduced from Trinidad.

3 were introduced from South Africa.

4 were old Queensland canes—viz., Rappoe, Meerah, White Bamboo, and Striped Singapore.

1 was introduced from Barbadoes.

110

From 1895 to 1901, 16 of these (all from New Guinea) died out, but, it having been ascertained that some of them were still in existence at the Kamerunga Nursery, 10 of them were reintroduced at Mackay. From 1901 to 1907 these varieties were most rigorously tested, and every chance to prove themselves was provided. It was found that many of the canes, while showing a good sugar content, were so light in weight and difficult to cut that they were valueless from the farmer's point of view, and were discarded. Others developed the disease, but those of high class as sugar producers were planted out upon new land and carefully nursed in the hope of their recovering, which, however, they failed to do, so they were also discarded. A further number were found to be of small commercial value, and were also discarded. Out of the 110 varieties, therefore—

87 were discarded,

8 died out,

15 were retained as of commercial value.

110

The 15 retained were ultimately reduced to 4—viz., New Guinea 15 or Badila, N.G. 24 or Goru, N.G. 24 A, Striped Goru, and N.G. 24 B Green Goru. The mean sucrose and purity of six years' analyses are summarised hereunder:—

Name or Number of Variety.	Average of the Six Years.	
	Sucrose.	Purity.
New Guinea 15 (Badila)	20.68	94.4
New Guinea 24 (Goru)	18.79	93.4
New Guinea 24A	19.19	93.1
New Guinea 24B	18.42	91.6

The crop results for the six years were as follows :—

CROP RESULTS, 1904-1908.

NAME OR NUMBER OF VARIETY.	PLANT CROP, 1904.		FIRST RATOON CROP, 1905.		SECOND RATOON, CROP, 1906.		THIRD RATOON CROP, 1907.		FOURTH RATOON CROP, 1908.		FIFTH RATOON CROP, 1909.		TOTAL YIELD, SIX CROPS.	
	Yield of Cane per Acre in English tons.	*Yield of Sugar per Acre in English tons.	Yield of Cane per Acre in English tons.	Yield of Sugar per Acre in English tons.	Yield of Cane per Acre in English tons.	*Yield of Sugar per Acre in English tons.	Yield of Cane per Acre in English tons.	Yield of Sugar per Acre in English tons.	Yield of Cane per Acre in English tons.	Yield of Sugar per Acre in English tons.	Yield of Cane per Acre in English tons.	Yield of Sugar per Acre in English tons.	Yield of Cane per Acre in English tons.	Yield of Sugar per Acre in English tons.
New Guinea 15 ..	59.8	10.8	53.8	10.1	41.6	7.7	43.0	7.9	34.0	6.3	38.3	7.4	270.5	50.2
(Badila)														
New Guinea 24 ..	63.5	11.1	51.8	8.5	33.0	5.5	54.0	8.9	61.6	10.2	Not Ra	tooned	263.9	44.2†
(Goru)														
New Guinea 24A ..	58.9	9.6	51.3	8.9	36.7	6.3	41.0	6.9	42.1	7.3	36.7	6.5	266.7	45.5
New Guinea 24B ..	60.4	8.9	49.0	8.4	34.7	5.8	40.0	6.7	39.4	6.6	34.0	5.6	257.5	42.0

* The yield of sugar per acre means the actual sugar per acre produced by the crop, and not the amount recovered by the mills, which is a variable factor, depending on the modern or other character of each factory.

† Five crops only.

1905 TO 1908.

Ten Hambledon seedlings from the Colonial Sugar Refining Company were introduced upon the Mackay station during this period; also Mauritius Malagache, Barbadoes 147, and 6 Queensland seedlings. Of these the Hambledon seedlings 114, 222, 285, 426, 458, Mauritius Malagache, and Barbadoes 147 have been distributed and are still cultivated.

1909.

The following varieties were introduced during 1909, direct from Mauritius, viz.:—

Mauritius 779, 55, 87, 1237, 1022, 998, 1474, and 89.

Mauritius 189 and Gouve were also brought from the North to the Mackay station this year. Of these, M. 55, 87, 89, and 189 were distributed, and are still grown to a small extent.

1910.

During this year some 143 cane varieties were received by the Mackay station from the Acclimatisation Society in Queensland, and were planted out. These comprised Queensland, Barbadoes, and Demerara seedlings. They were received in very poor condition, being very dry and stunted, consequently only 98 germinated. Some of these later on died out, while others became affected with disease. Trinidad 211, Louisiana Striped, Demerara 117, and Demerara 604 were also introduced this year.

Of the above canes, the following were selected for distribution and are being cultivated:—

Name of variety.	Percentage of commercial cane sugar.
Q. 135	13.0
Q. 813	16.0
Q. 855	15.0
Q. 903	14.8
Q. 970	16.0
Q. 1001	14.5
Q. 1092	13.0
Q. 1098	15.5
Q. 1121	15.3
D. 1135	14.5
Hybrid No. 1	16.0
Badila Seedling	16.7

1912.

In September, October, and November of this year Mr. T. H. Wells obtained in New Guinea some 162 varieties. These were consigned to the Sugar Experiment Station at Mackay, where they were planted out by hand, special care being taken with each plant. These were thoroughly tested up till 1921, by which time nearly all of them were discarded as of little use to the industry, the commercial cane sugar content not being sufficiently high to warrant their retention and distribution, as they were not likely to be sought after by farmers in these days when the commercial cane sugar content is such a vital factor. There was nothing in the collection to come anywhere near Badila or the three Gorus. Of the 162 varieties, the following have been temporarily retained:—

Name of variety.	Percentage of commercial cane sugar.
N.G. 81	14.9
N.G. 89	14.7
N.G. 90	14.3
N.G. 94	12.5
N.G. 102	14.0
N.G. 103	15.0
N.G. 164	14.5

1914.

Two canes were introduced to the Mackay station this year—viz., Gingraya and Gingor. These were crosses raised by Mr. Croften, of Ayr, from Mauritius, Gingham, and Oraya, and Mauritius Gingham and N.G. 24 A or Striped Goru. The latter is a good cane, containing 16 per cent. commercial cane sugar, and has been retained and distributed.

1915.

Shahjahanpur No. 10 was introduced from India with the advice that it would stand cold weather well. Its resistance to frost has been well established at Bundaberg and many other Southern districts. Its sugar content and cropping qualities have been good. The commercial cane sugar is 15 per cent.

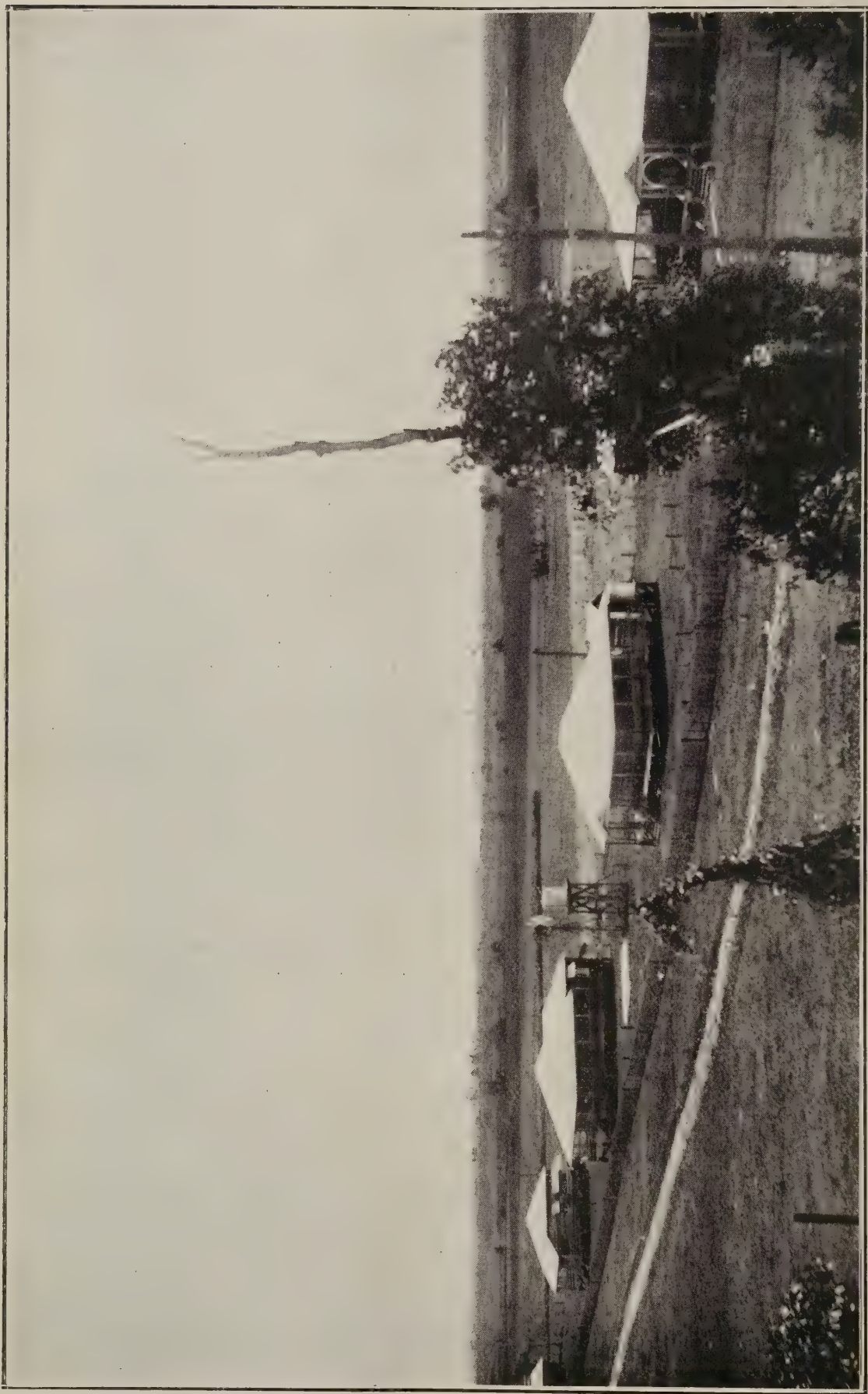


PLATE 57.—SUGAR EXPERIMENT STATION, SOUTH JOHNSTONE.

1916.

During this year the following varieties were introduced on the Bundaberg Sugar Experiment Station:—Mauritius 1504, 2904, 16804, 22204, Java E.K. 1, E.K. 2, E.K., 28, 100 Bont, 247 Generatie; and to the Mackay station per favour of the Colonial Sugar Company, from Fiji:—8 R. 431 and 7 R. 428. The only Mauritius cane out of those introduced this year that has been retained is M. 16804. All the Java canes have been retained so far, and E.K. 1 and E.K. 28 are very promising canes, and have been distributed. The 7 R. 428 or "Pompey" is also a good cane, and has been distributed.

1917.

From the Experiment station at Hawaii the Bundaberg Sugar Experiment Station received the following three canes, viz.:—H. 109, 146, and 227. The Mackay Station received from the West Indies B. 4030, 6450, 254, 4596, 6204, 4934, and Demerara 109; while the Colonial Sugar Refining Company supplied Obo Badila from New Guinea. Of these, B. 254, 6204, and 4934 died out. The three Hawaiian canes have been tested and are being distributed. The remainder of the West Indian canes are still under examination. Obo Badila has been distributed to canegrowers. It is apparently the same as the old N.G. 15 or Badila, but a new introduction.

1919.

This year a new lot of Mauritius canes was introduced—viz., M. 3210, 2810, 131168, 551182, and 5511. These are still being examined.

1921.

The following seedlings, which were discovered in the sandy bed of the Mowbray River, near Mossman, were sent to the Bureau by courtesy of the Mossman Central Mill Company:—Mossman Queensland 1, 2, 3, 4, 5, 6, and 7. These are being tested at the South Johnstone Sugar Experiment Station. No. 1 is a cane similar to Badila, and has been distributed. The remainder are still being tested. A further shipment of Mauritius canes, as follows, were also received at the Bundaberg Sugar Experiment Station—viz., Mauritius 6414, 55143, 21958, 3395, 131126, R.P. 6, R.P. 8, and R.P. 73. These are still under examination. Two hundred seedlings were raised at the South Johnstone Sugar Experiment Station during this year and have been planted out on the field.

1922.

Fresh introductions of cane from foreign countries are being made this year.

GENERAL.

The beneficial results of the work undertaken at the Experiment Station in the constant introduction and selection by cropping and chemical testing cannot be over-estimated. No cane has a perennial existence; sooner or later, if constantly grown, it is bound to fall a victim to disease, and the Bureau must be on the constant lookout for new canes. That only a few canes of commercial value can be obtained from large numbers tested is, of course, well known. Out of many thousand seedlings raised in Queensland only a few were finally selected. In Barbadoes over one million seedlings were raised, yet only four are in general use. At Demerara the same story obtains, there being only some seven canes that are of value out of considerably over a million raised. The farmer cannot undertake this work for himself, and must look to the Experiment Stations for the introduction of new canes. A very great expenditure in time and money is thus saved to the grower. If no more had been done than the introduction of the two canes Badila and Goru into Queensland, it would have amply justified all the money that has so far been spent on Sugar work.

TESTING OF CERTAIN VARIETIES OF CANE AT MACKAY.

Tests made at the Mackay Sugar Experiment Station for the purpose of determining the relative richness of H.Q. 426 (Clark's Seedling), N.G. 15 (Badila), N.G. 24 (Goru), Cheribon, Malabar, and Otamite.

A series of analytical test plots were instituted at the Mackay station in 1913 to determine the relative values of H.Q. 426, Badila, Goru, Cheribon, Malabar, and Otamite during the crushing period, June to December. The first series of these experiments were planted in the early part of the season—viz., March—and the second series in August of the same year. With the exception of time of planting, the conditions governing the experiments were the same in each case. Analyses of these two

plant crops of different ages were commenced in June, 1914, and continued till December of the same year. In the following year, 1915, the first ratoon crops were again tested over a similar period, as were the second ratoon crops in 1916. They showed conclusively that over the seven months the H.Q. 426, Badila, and Goru were of considerably higher sugar content than Cheribon, Malabar, and Otamite. The latter canes show a low analyses for the first three months, but from September onwards they considerably improve.

The results of the three crops from the early and late plantings are summarised hereunder:—

IN THE TABLE FOLLOWING THE RESULTS HAVE BEEN AVERAGED FOR THE THREE YEARS SO THAT THE SUGAR CONTENTS IN THE TERMS OF C.C.S. ARE APPARENT AT A GLANCE.

VARIETY.		PLANT CROP, 1914.		FIRST RATOON CROP, 1915.		SECOND RATOON CROP, 1916.	
		Average 7 Months' Analyses.		Average 7 Months' Analyses.		Average 7 Months' Analyses.	
		Early Planting. C.C.S.	Late Planting. C.C.S.	Early Planting. C.C.S.	Late Planting. C.C.S.	Early Planting. C.C.S.	Late Planting. C.C.S.
H.Q. 426	..	% 16.0	% 16.6	% 18.4	% 18.8	% 14.9	% 15.0
Badila	..	15.1	16.6	19.8	18.7	14.9	14.5
Goru	..	13.2	13.9	17.0	16.4	12.7	12.2
Cheribon	..	12.6	12.6	15.6	15.5	12.4	11.7
Malabar	..	11.8	11.8	15.0	15.3	11.4	11.3
Otamite	..	11.0	11.4	15.0	15.0	11.5	11.0

Although the three latter canes are not much grown outside Mackay, the results are generally interesting, particularly having regard to the action of the Central Sugar Cane Prices Board in fixing, in most instances, analyses as the basis of payment for cane.

CERTIFICATES OF SOUNDNESS.

Certificates of Soundness as under-listed were issued in the course of September, 1922 :—

Name of Stallion.	Breed.	Period for which Certificate issued.	Owner's Name.	Owner's Address.
Silver Son ..	Blood ..	Life ..	F. Dreyer ..	Eagleby, Beenleigh
Veresdale ..	Blood ..	Life ...	W. Elliott ..	Veresdale, Upper Logan
Some Wilkes..	Trotter ..	Life ..	C. F. Pinnaud ..	Eagleby, Beenleigh
Spark ..	Trotter ..	Life ..	J. E. Wallace ..	Red Hill, Gympie
Marvin Cole ..	Trotter ..	12 months	H. Dunkley ..	Withcott, <i>via</i> Helidon

“BUNCHY TOP” DISEASE IN BANANAS—INTERESTING EXPERIMENTS.

Mr. T. Brooks, of Highfield, Murwillumbah, claims to have discovered a cure for the “bunchy top” disease in bananas. In 1920, Mr. Brooks treated portion of his plantation with sulphur, but this did not have the effect desired. In May last, root rot set in, and in December it appeared as if the whole plantation was “settled.” Mr. Brooks now contends that the sulphur applied last year, at the rate of about 8 cwt. per acre, together with island fertiliser, plays an important part in the treatment he is now applying. He has started with a mixture which he calls basic super, which contains 45 per cent. lime and 17 per cent. phosphoric acid. This was applied in some cases around the stools to a radius of 3 feet or 4 feet, in two plots. The whole surface was treated with from 8 cwt. to 10 cwt. per acre, and the suckers before being planted were well dusted with the mixture. All suckers planted were taken from “bunchy top” stock, but of the 800 planted since April not one, so far, appears to be affected with the disease. On the contrary, every leaf shows splendid colour, and the stems are strong and vigorous, while the growth for this time of the year is exceptional. Old stalks up to 5 feet high, which obviously were badly affected with the disease, are now throwing out vigorous centre leaves and evidencing fullness of sap.

Although the experiments are only in part developed, and a whole season is necessary to stamp them as conclusive, the hearty growth of every plant treated, and the unusual crop of peas, beans, and other vegetables, demonstrates that Mr. Brooks has developed a wonderful growth force in his soil.

Mr. Brooks is making his discovery public in order that it might form a base for further experiment should it fall short of expectations. His line of reasoning is that the application of the sulphur renders the phosphates soluble, so that they can be readily taken up by the plant, hence the rapid growth following the sulphur treatment. But this also allowed the heavy autumn rains to wash the phosphates out of the soil, which accounts for the return of the disease after the rain last year. The sulphur remaining in the soil acts as a fungicide, and connecting with the basic super, assists the restoration of the lost sulphates. The lime contents give a warmth and sweetness and stimulate the root growth.

Discussing the matter recently, the Minister for Agriculture and Stock (Hon. W. N. Gillies) remarked that developments in this connection were being closely watched, and that his Department is in communication with the New South Wales authorities on the subject. From departmental information there is very little evidence of “bunchy top” in Queensland.

SCIENCE NOTES.

By EDMUND JARVIS, Entomologist, Bureau of Sugar Experiment Stations.

THE INFLUENCE OF CHEMOTROPISM ON *LEPIDODERMA ALBOHIRTUM* WATER.

The chemotropic response of insects to artificial stimuli is a subject worthy of close investigation, and one which presents a wide field of possibilities in connection with the control of various destructive species.

Most entomologists are aware of the fact that insects as a rule react positively, or, in other words, are attracted towards their food or that of their future offspring by

the presence of various odours emanating from it; which, although of a nature far too subtle for us to perceive, are, nevertheless, appreciable to creatures endowed with highly specialised olfactory organs.

Chemotropic reaction occurs also during the periods of mating and oviposition, the sexes in many instances being able to approach and find each other from long distances by the help of certain odours secreted by special scent-glands; while the egg-laden female is similarly guided during her search for suitable food for the future larvæ.

Entomologists have not been slow to realise the economic significance of this method of combating insect pests, much attention having been given of late years to the construction of bait-traps for attracting fruit-flies, vine-moths, &c.

With regard to the question of controlling our grey-back cane-beetle by means of aromas, we have good reasons for assuming that the movements of this insect are very sensibly affected by forces of a chemotropic nature, which probably exercise important influences on the flight of the females during the period preceding oviposition.

Initial experimentation with aromas was carried out by the writer in December, 1915, when it was discovered that grey-back beetles reacted negatively towards such odours as cajeput oil, acetic and carbolic acids, nitro-benzine, oil of almonds, &c. but were not in the least influenced by odours arising from oil of cloves, fish oils, or even the fumes of 40 per cent. formalin.

The olfactory sensibilities of this species, however, were amply demonstrated, and I felt justified in believing that reaction of a positive nature was certainly attainable.

With a view to securing further data in this connection, these experiments were continued last December (1921), the odours used being placed in small tins 4 inches deep by 3½ inches in diameter, and resembling those emitted by the stem and foliage of chief food-plants of the beetle, together with miscellaneous aromas such as arise from decaying vegetation, soils, roots, &c.

Some of these bait-traps were exposed in cane fields, being simply let into the ground between rows of cane, with the top edge of the tin level with the surface, while others were hung among the branches of a large native fig (*Ficus pilosa*), which is a favourite feeding-tree of the beetles (see photo. in "Queensland Agricultural Journal," Vol. xvii., p. 38).

With regard to the anatomy of the antennal organs in *Lepidoderma*, it will be noticed by the accompanying illustrations that the four plates composing the club are closely covered with olfactory pits or pori (Fig. 1), each containing a central peg-shaped body of very variable form and length, usually tipped with a short seta or bristle.

An outline of a vertical section of four of these pits is shown greatly magnified at Fig. 2, and a plan of two of them at Fig. 3.

Each peg is connected with the olfactory nerve by means of a delicate fibre, indicated diagrammatically in the section at Figs. 4, 4.

These pits, which occur in the chitinous portion of both sides of the two inner lamellæ of the female and on the inner surfaces of the outer plates, number about 18,500, and in male specimens 24,500.

In the latter sex, however, the club consists of five plates, the fifth being one of the outer ones, and usually smaller than the others.

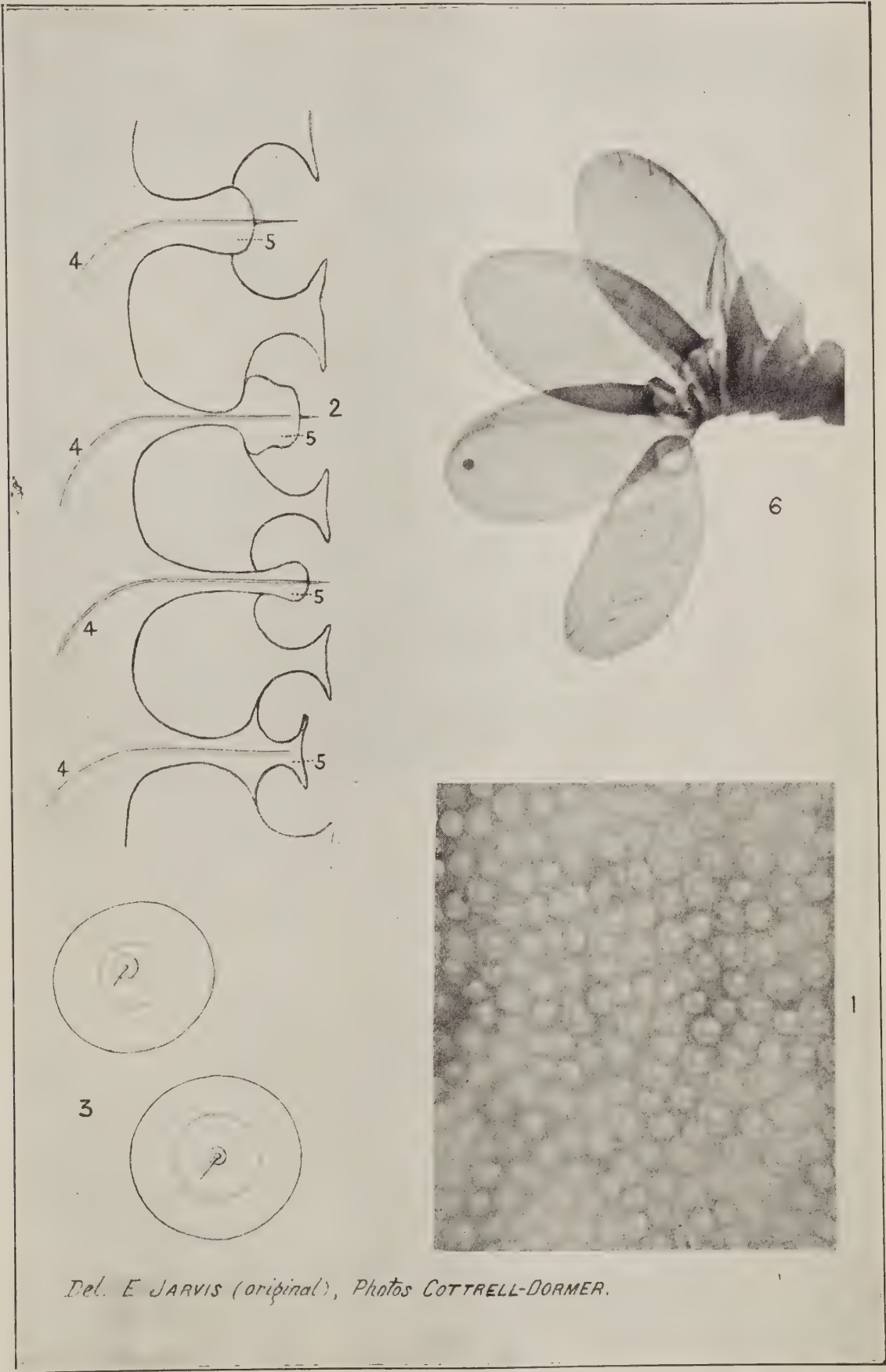
Whilst feeding or resting on the trees in a torpid condition, the antennal lamellæ are held close together in the form of a solid-looking club, but when flying, or under the influence of excitement, the beetle opens them out fan-wise, in order to expose to the air the greatest number of olfactory nerve fibres.

There can be little doubt that the highly sensitive antennæ of this insect help it to locate the position of favourite feeding-trees, since isolated specimens of such figs as *Ficus pilosa*, *cunninghami*, &c., are usually loaded with beetles each season, although often growing alongside or close to food-plants that happen to be less palatable.

We are making preparations for experimenting during this coming season with a large variety of aromas, comprising various essential oils and aromatic essences, &c., distilled or extracted by the process of enfleuragé from favourite food-plants of our grey-back cane-beetle.

I have already pointed out the importance of this ideal control method (Reports Sept. 1914 and Nov. 1921), which may enable us to capture the female beetles before they have had time to deposit eggs.

In the event of success in this connection being obtained, it would then be a comparatively simple matter to design suitable traps of a mechanical nature that, when baited with the attractive aroma could be so arranged in cane fields as to lure to destruction most of the invading beetles.



Del. E JARVIS (original), Photos COTTRELL-DORMER.

PLATE 58.—(For description, see page 310).

DESCRIPTION OF PLATE.

- 1.—Olfactory pits in lamella of antennal club of *Lepidoderma albohirtum* Waterh.
× 620.
- 2.—Diagrammatic section through same, showing four pits containing central pegs with apical setæ (5, 5.); connected with olfactory nerves (4, 4.)
× about 9,000.
- 3.—Plan of two olfactory pits, showing sensitive pegs.
- 4.—Antennal club of female with lamellæ opened out. × 28.



Photo: G. H. Worth.]

PLATE 59.—COCOANUT TREE ON JOHN DANIEL JOYCE'S
PLANTATION, "WAI VURI," INNISFAIL.



Photo: G. H. Worth.]

PLATE 60.—JOHN DANIEL JOYCE'S PLANTATION, "WAI VURI," INNISFAIL.



PLATE 61.—14,000 BAGS OF F.A.Q., ALLORA WHEAT DUMP, 1922.

SOME PRIZE-WINNERS, ROYAL NATIONAL SHOW, BRISBANE, 1922.



PLATE 62.—JUDGING THE JERSEYS.

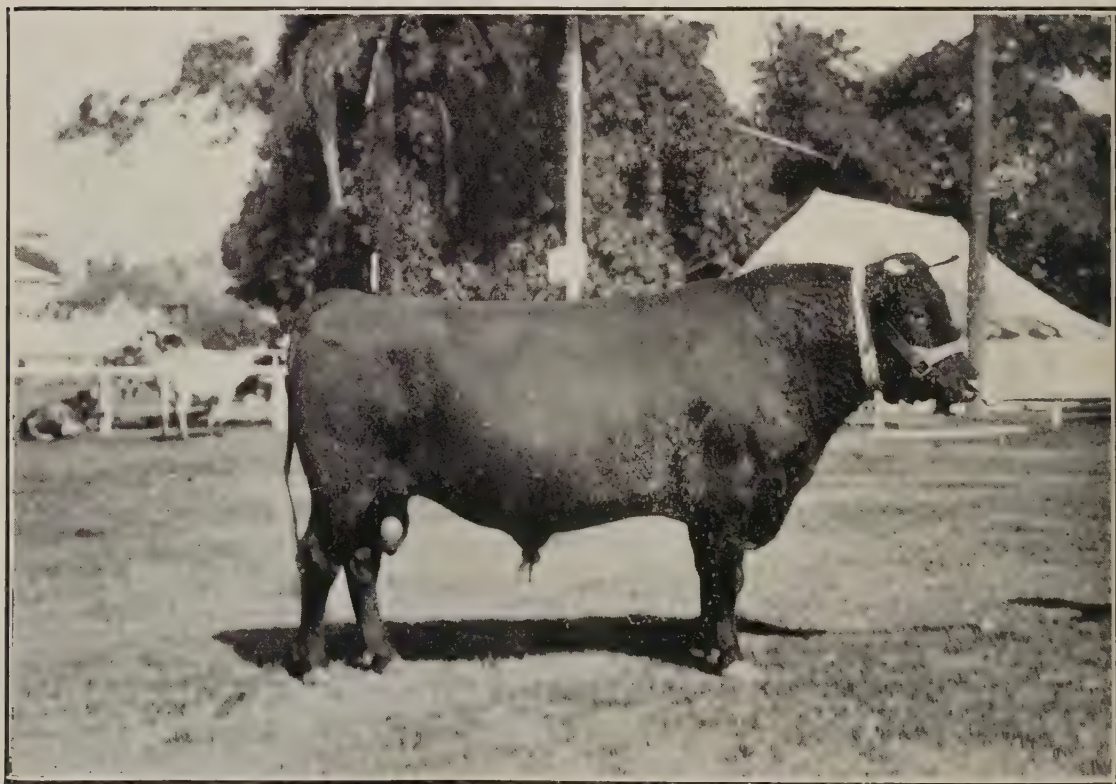


PLATE 63.—I.M.S. BULL, THOR OF GREYLEIGH. The property of G. E. J. Chaseling, Brundah, Coolabunia, Q.



PLATE 64.—A CLOSER VIEW OF THOR OF GREYLEIGH, WINNER OF THE THREE-YEAR-OLD I.M.S. BULL CLASS, AND ONE OF THE NICEST SPECIMENS OF THE BREED THAT WE HAVE AT PRESENT IN QUEENSLAND.

He is a son of Joffre and Dandy 4th of Greyleigh. First in the powerful three and under four class, National, 1922. His wins include first and champion at Wondai, 1922; first and champion at Murgon, 1922; first for bull and progeny at both the before-mentioned shows, and many other prizes.



PLATE 65.—FUCHSIA OF STRATHDHU (431).

By Victor 2nd (27), dam Carnation. First prize I.M.S. cow five years old and over, in milk, and champion. Bred by and the property of S. Mitchell, Warwick, Q.



PLATE 66.—MARGARET ANGLIN 2ND OF BERRY (81).

By Powerful of Brundee, dam Margaret Anglin. First prize and champion Friesian cow. (Record, 13,200 lb. milk and 533.76 lb. butter in 273 days.) The property of Mr. S. H. Hosking, St. Gwethian, Toogoolawah, Q.



PLATE 67.—MAUD ROOKER KORNDYKE (IMP., 589).

By Tsussie Rajah, dam Minnie Rooker Tsussie. First prize Friesian heifer, 2 years and under 3 years, in milk, and Reserve Champion, Brisbane Royal National Show. The property of Mr. Fred G. Brown, Mooroombin, Toogoolawah, Q.



PLATE 68.—CHAMPION FRIESIAN BULL, MENELEUS OF ST. ALBANS (MCLEOD).



PLATE 69.—OXFORD PALATINE SULTAN (1126),

By Prince Palatine (imp., 760), dam Sultane 4th of Oaklands (imp., 1398). Third prize Jersey bull four years old and over. The property of Mr. W. S. Conochie, Brooklands, Tingoorra, Q.

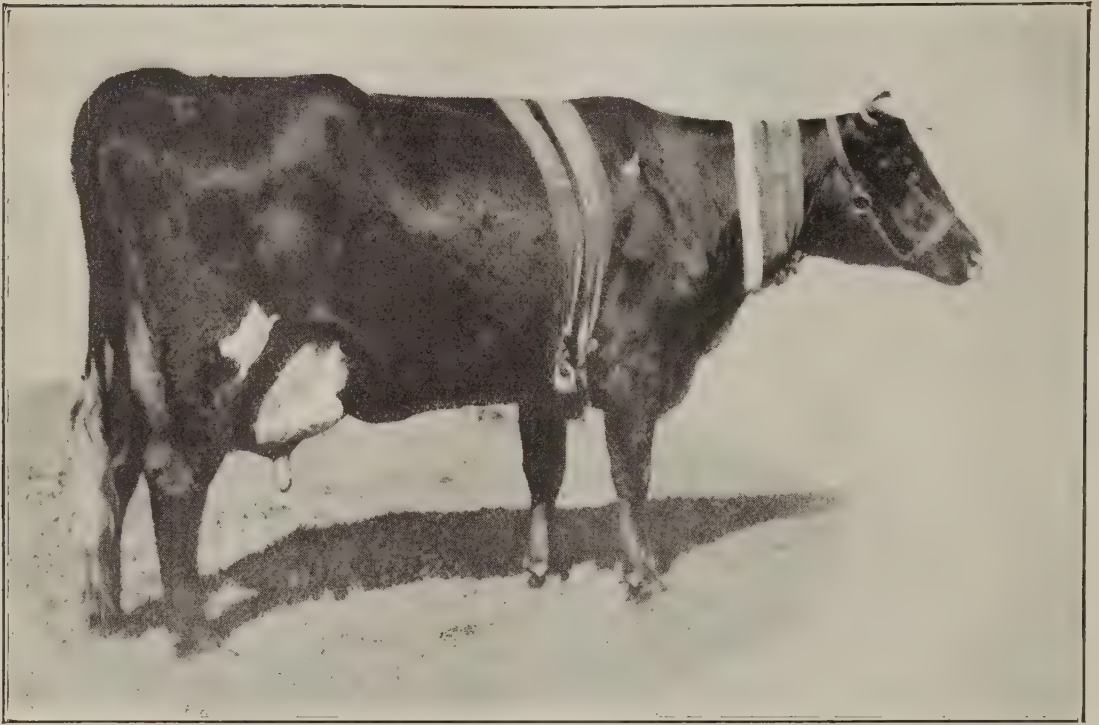


PLATE 70.—JEAN 5TH OF BLACKLANDS (303).

By Sir Hugh of Hillview (26), dam Jean 4th of Blacklands (100). Second prize cow, five years old and over, in milk, and reserve champion. Bred by and the property of A. Pickels, Blacklands, Wondai, Q.



PLATE 71.—LORNA OF ARLEY (50).

By Captain, dam Lady. First in both classes for cow, four years old and over, averaging the greatest daily yield of butter fat for 48 hours, with 6·587 lb. butter; winner of the special prize for cow, four years old and over; second in class for cow yielding the largest supply of milk in 48 hours, with 132·9 lb.; and winner of the National champion butter fat test. Bred by and the property of E. D. Lawley, Arley, Maleny, Q.



PLATE 72.—JELlicOE OF MARINYA (914).

By Gordon of Marinya (186), dam Iduna of Marinya (515). First prize Bull, three years old and under four years, and champion Ayrshire bull of Queensland, Brisbane Royal National Show. Bred by and the property of J. H. Fairfax, Marinya, Cambooya, Q.

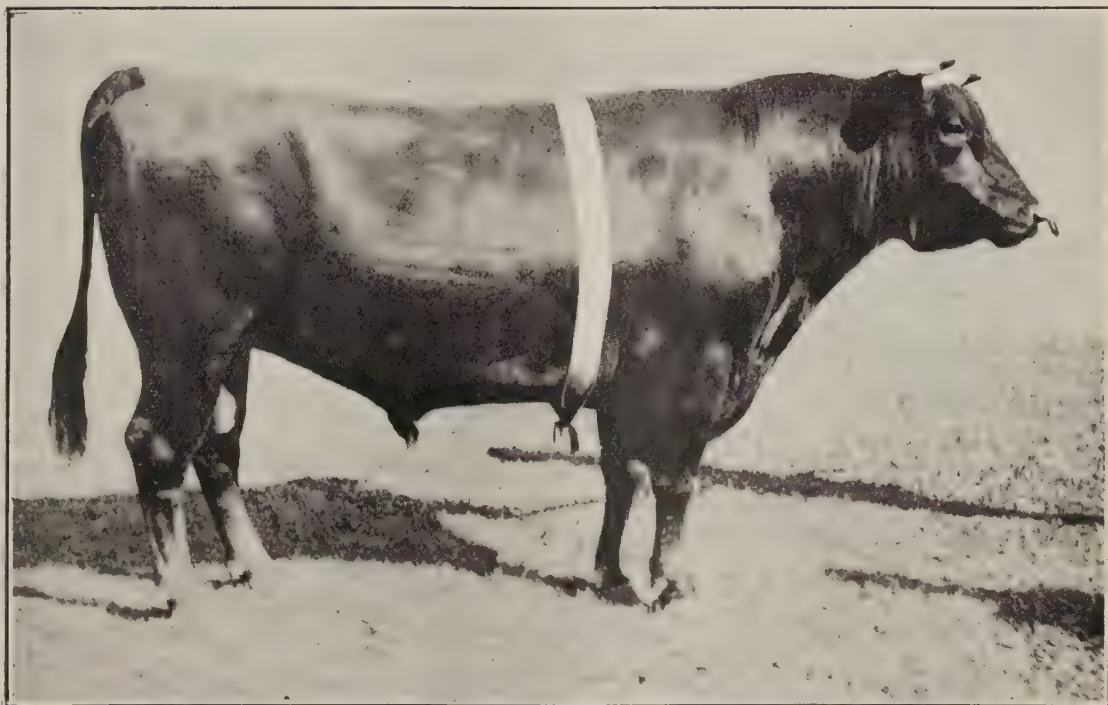


PLATE 73.—SOVEREIGN OF WARDEN (P.I. I.M.S.H.B. OF A.).

By Ensign of Warden, dam Folly. First prize I.M.S. bull, four years old and over, and champion. The property of F. O. Hayter, Spurfield, Pomona, Q.

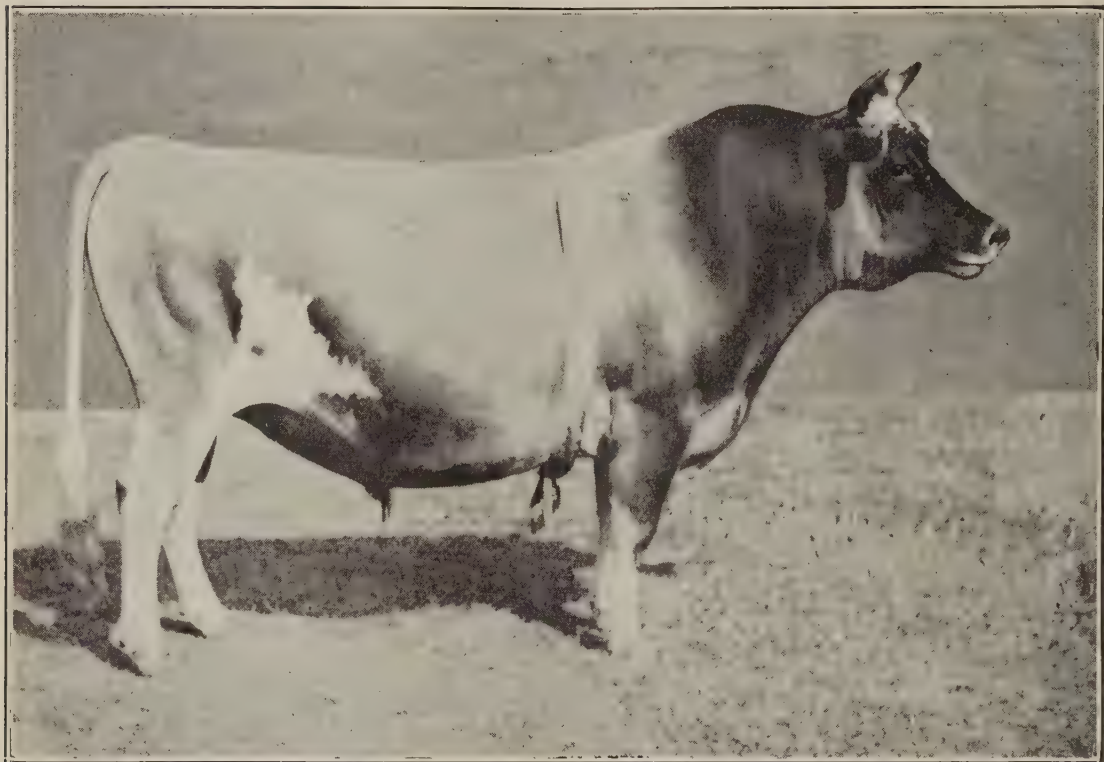


PLATE 74.—OXFORD GOLDEN NOBLE (1128).

By Prince Palatine (imp., 760), dam Oxfordia of Oaklands (1397). First and Champion Jersey bull; first for sire and three of his progeny, first in exhibitor's group, first in sire's progeny stakes group. This is the third year in succession that he has won the championship. Bred by and the property of E. Burton, Wanora, Q.

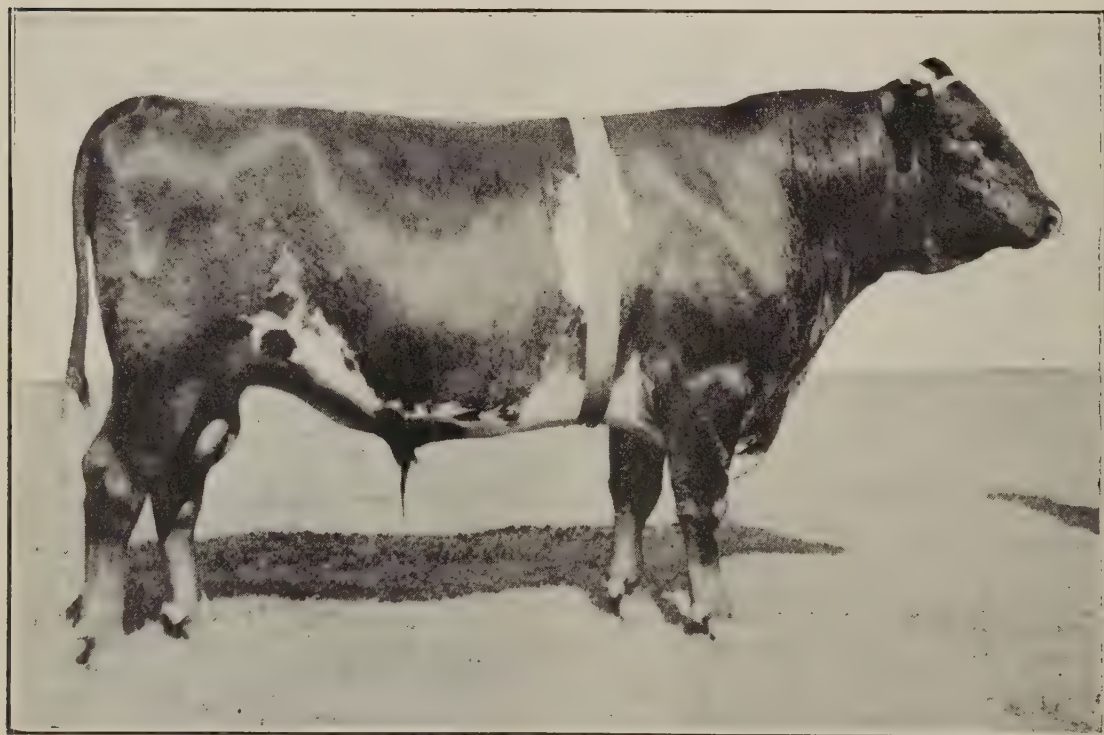


PLATE 75.—CHARM'S DUHALOW OF OAKVALE (P.I. I.M.S.H.B.).

By Gem's Plum of Hillview, dam Charm of Glenthorn (213). First and reserve champion, and first in both groups. The property of Ben. O'Connor.



PLATE 76.—OXFORD GIRL (2210).

By Pussy's Golden King (382), dam Buttergirl (411). Second prize cow, 5 years and over, in milk; first for Australian-bred Jersey; and reserve champion, Brisbane Royal National Show. (Record 2·005 lb. butter in 24 hours.) Bred by and the property of E. Burton, Wanora, Q.

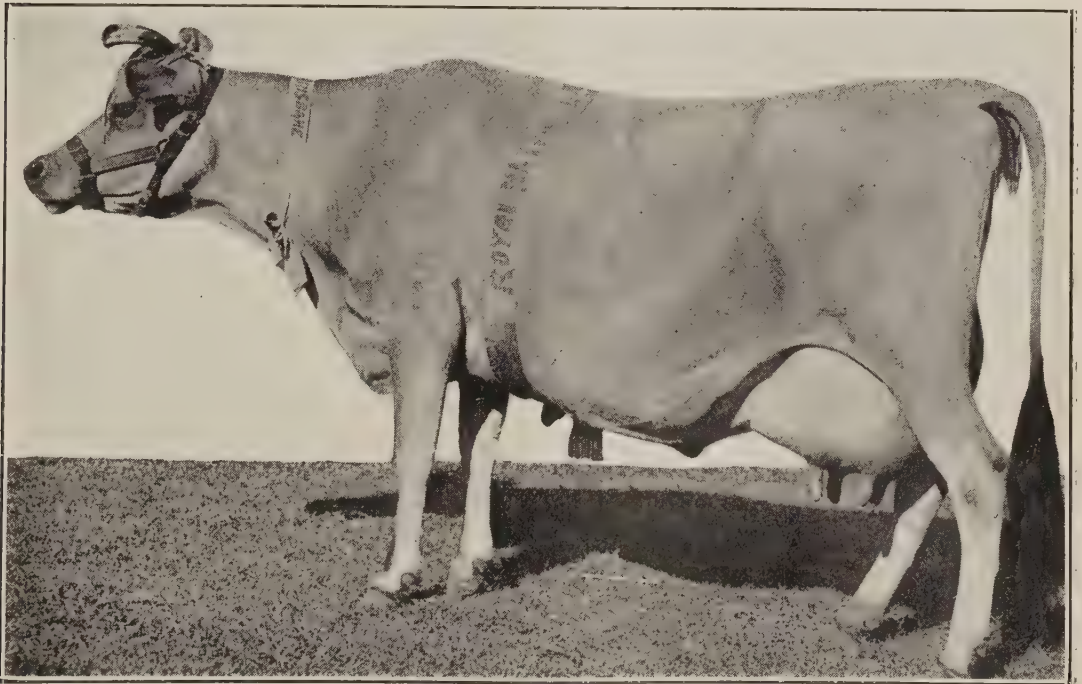


PLATE 77.—LARKSPUR.

Champion Jersey Cow, and lately the property of W. and D. Carr, Indooroopilly. Larkspur, a great prizewinner in every Jersey class in the show ring, died last month.

Editorial Notes.

Building up The Agricultural Industry.

It is believed that the Queensland Producers' Association will do much towards building up a real rural civilisation in this State. It is an outcome of a great movement, a movement inspired by a big ideal, possessing strong dynamic power governed by a great central idea. It is a movement which even now seems much bigger to those outside it than to those inside it. A man on the edge of a crowd can best measure its greatness and force. Complete organisation of the agricultural industry is now being transferred from the sphere of academic argument to the field of fundamental fact. Perhaps the most encouraging thing about the organisation now going on in Queensland country districts is the caution with which the proposal has been received and the restrained enthusiasm of those by whom it has been accepted. Experience shows that many similar movements have often been spoilt at the outset by being overwhelmed with the rush and gush of unrestrained rhetoric and the badly balanced zeal of unthinking enthusiasts; but when a movement is based solidly on business principles and guided by men of experience and broad vision, who are capable of thinking nationally as well as sectionally, then its success follows in natural sequence.

* * * * *

There can be little orderly building in an industry unless the people concerned are of one mind. There must be an idea, in the sense of vision, of larger results and better conditions common to the greatest number. Legislation can make, provide, and has provided the plans and specifications of a great rural development in Queensland, but the farmers must do the building. The hope of prosperity by ballot is the last excuse between them and the stern realities of hard work and paying the price. Men and women do not grow strong except by overcoming obstacles.

* * * * *

To those of us who have had an opportunity of studying on the spot the conditions of agriculture in the older countries, there appears to be one big difference between farming in Australia and in Europe. Here farmers produce crops and let their industry go at that. They stop at production. Someone else prepares the product for market and markets it. In Europe farmers do not let their interest in their produce end when the last load has gone over the weighbridge. When their crops are bagged, baled, and crated, individualism ceases, and co-operation is applied to prepare their produce for market, control its sale, and finance the whole operation. In Queensland to-day agriculture stands on one foot; in Europe it stands on four. With agriculture thoroughly organised and backed by statutory power, anomalies should cease to be, and rural life and industry should regain its rightful place as the most vital factor in our national life.

* * * * *

Civilisation was not built on a few square miles of bricks and concrete. Cities grow big because they suck up the wealth of the country. Babylon and Nineveh built their skyscrapers on the energy of the toilers on the soil. Ancient Rome was a humanity-absorbing vortex. These cities were great, but their greatness was not a source of pride in the hearts of the farmer who starved that their citizens might feast, who grew the grapes to make their masters drunk. If farmers are to obtain and retain a fairer reward for their energy and enterprise, if they are ever to enjoy the comforts and advantages of a real civilisation, they must make it their steady, persistent, and fundamental policy to work towards complete control over the manufacture and sale of their primary products. Such a policy comes well within the ambit of the Queensland Producers' Association, an association whose sponsors and constituents are alike bent on realities.

Event and Comment.

Agricultural Legislation.

The present Parliamentary session is noteworthy for the number of measures dealing with various phases of the agricultural industry. Included among the legislative proposals submitted were the Water Power Bill, Primary Products Pools Bill, Irrigation Bill, Fruit Cases Act Amendment Bill, and Lands Act Amendment Bill. Among the more important agricultural measures that have already become law is the Agricultural Education Act, and by the time this reference appears it is presumed that all the agricultural measures of this session will have become listed among our statutes.

The Primary Products Pools Bill.

As outlined by the Minister for Agriculture (Hon. W. N. Gillies) in the course of his second reading speech, this Bill is of considerable importance to Queensland. Its object is to give the Governor in Council power to proclaim any primary product a product within the meaning of the Act, and to bring into existence a committee or pool to control that industry. It is not experimental, for there are already in existence two Pool Acts in this State covering selling operations in wheat and cheese. The measure is a simple one, and is based on the Wheat Pool Act. The success of the wheat and cheese pools has justified the enactment of general pooling legislation. One of the advantages of the pooling system is that it is an extension of the co-operative principle, bringing the whole of the producers in any section of the agricultural industry together, enabling them to handle their commodity in bulk, financing their business as it can only be financed under such a scheme, regulating the market, reducing intercepted charges, and eliminating speculation in farmers' produce. A study of our existing marketing system discloses the illuminating fact that probably only a little over 30 per cent. of the price paid by consumers for commodities produced by the farmer is received by the farmer. The principal clause of the Bill is clause 3, which provides that—

“The Governor in Council may from time to time by Order in Council declare that any grain, cereal, fruit, vegetable, or other product of the soil in Queensland, or any dairy produce or any article of commerce prepared other than by any process of manufacture from the produce of agricultural or other rural occupations in Queensland, is and shall be a commodity under and for the purposes of this Act.”

“The Government do not wish to force a pool on any section unless the majority of the growers require it, and they think that it is quite sound to make the minority of 25 per cent. agree to the pool when the other 75 per cent. require it,” declared Mr. Gillies in the course of a further explanation of the provisions of the measure.

The Irrigation Bill—Dawson Valley Scheme.

The purpose of this Bill is to obtain the necessary Parliamentary sanction to go on with the preliminary work of investigation in connection with the Dawson Valley scheme, and also to provide machinery for the proper control of schemes of that kind. In the course of the discussion on the second reading, the Treasurer (Hon. E. G. Theodore) said, in relation to the Dawson Valley project, that it had all the potential advantages of a very successful scheme. “It is possible,” continued Mr. Theodore, “to store a large quantity of water at a comparatively moderate expenditure. The site of the dam has all the natural features required for the accumulation and storage of water, which will not be very far distant from the land to be irrigated. The whole of the land embodied in the scheme and coming within the influence of the scheme will be served by gravitation from the storage supply. The irrigable land is very extensive. It is of high-class quality, and there will be more land than there is water to supply, so there is no deficiency of irrigable land. Looking at it from the point of view of soil analysis, location, distance from ports, and everything else, it should result in a highly successful irrigation scheme.”

Fruit Standards and Packing.

Speaking on the Fruit Cases Act Amendment Bill, the Minister for Agriculture (Hon. W. N. Gillies), who had charge of the measure, remarked on the difficulty of setting up standards for some of our fruits, but efforts would be made to set up standards for all our leading fruits. The Bill provides for the cross packing of bananas in standard cases containing 3,564 cubic inches. The Cavendish variety will be graded in three qualities. Choice bananas are to be of a minimum length of 9 inches with a minimum circumference of 5 inches, the fruit to be free from blemish. First grade bananas are to be of a minimum length of 7 inches with a minimum

circumference of 4 inches, and so on. "We have been able," Mr. Gillies continued, "to profit by experience with regard to legislation in the South dealing with standardisation of fruit. I am sure the Bill will make for the benefit of the producers, and I think the consumers will also benefit, too."

Butter and Cheese Production.

Some striking figures illustrating the expansion of the dairying industry in Queensland were quoted by Mr. F. M. Forde, M.L.A., in the course of a speech on the Primary Products Bill recently. After referring to the wide disparity between the prices of Australian butter and of the dairy products of other countries on the London market as a result of a lack of a complete oversea selling organisation, Mr. Forde said that the dairying industry is of growing importance to Queensland, and its protection and encouragement are very necessary. From the Department of Agriculture and Stock he had received some very interesting tables showing the annual production and value of butter and cheese in Queensland since 1915. The information he received is tabulated as under—

QUEENSLAND BUTTER PRODUCTION.					Value.
lb.					£
1915	..	..	..	25,456,714	1,560,359
1916	..	..	..	28,967,279	2,051,848
1917	..	..	..	38,930,690	2,818,419
1918	..	..	..	32,371,575	2,765,071
1919	..	..	..	26,213,514	2,129,848
1920	..	..	..	40,751,373	5,093,922
1921 (estimated)	..	..	..	58,165,352	4,725,935

QUEENSLAND CHEESE PRODUCTION.					Value.
lb.					£
1915	..	..	..	4,383,410	178,076
1916	..	..	..	8,495,825	345,143
1917	..	..	..	11,142,114	452,648
1918	..	..	..	8,636,700	386,855
1919	..	..	..	8,296,318	388,889
1920	..	..	..	11,512,262	623,580
1921 (estimated)	..	..	..	13,079,124	667,579

The Queensland Poultry Industry.

In the course of his annual report, the Poultry Instructor (Mr. J. Beard) remarked that, with the exception of one or two districts, he found the poultry industry in a very flourishing condition. This was noticeable in the increased number of poultry farmers and stock, and the larger quantities of eggs coming on to the market. The increase for July over the corresponding month of last year was 54 per cent. and August, 60 per cent. Prices were from 15 per cent. to 20 per cent. higher than last year and these advanced values are accounted for by the stronger Southern demand for Queensland eggs. In the second half of August, over three-quarters of a million eggs were consigned to Southern markets. Further large shipments followed. The local demand was heavy and comparatively few were stored. A preliminary estimate of the cost of oversea export has been made and the deduction stresses, in the instructor's opinion, the un wisdom of shipping to England at present prices. The charges work out at 15s. 6d. per case, or 7½d. per dozen, and this, added to present local prices of 1s. 1½d. per dozen, means that eggs, to make good, would require to be sold at not less than 1s. 9d., and this price would not quite cover insurance and breakages in transit. There is no indication at present of opening a dressed poultry trade with London. Apart from shipping difficulties, there is to-day no Queensland surplus available for export. The existing supply cannot square with the local demand, and first-grade poultry is worth as much in Brisbane as in London without allowing for freight and other charges. Fully 80 per cent. of Queensland fowls are of the Leghorn breed, which does not produce a bird favoured at Smithfield. The one great drawback to the industry is the continued high cost of wheat and mill offals. Some of the wheat which has come under official notice is quite unsuitable for fowl feed. It is suggested that wheat should be released when it is sound and wholesome and not kept in the dumps until it has become almost useless, for poultry, to do well, must have the best of food.

Concerted Action and Compulsory Powers—A New Zealand View.

"Under united control we shall have reduced freights, reduced handling charges, reduced insurance costs, regulation of shipments, organisation of sale in England, and a complete system of advertising our produce in Home markets. Control of our produce is absolutely essential to success." Mr. E. Newman, a member of the New Zealand Parliament, thusly expressed himself ("Dominion," 16-9-22) at a meeting

of farmers in New Zealand recently. Continuing, the speaker advocated the establishment of one board with subsidiary boards for meat, wool, and butter, with power to bring all producers into line. Such a scheme would be absolutely useless without unanimity, and unanimity would be impossible without compulsory powers. 'There were always some people who liked to gain advantage over their neighbours, and that must not be permitted. He could not understand opposition to compulsion. 'Such a board would be appointed by the producers and would have no aim or object except to protect and promote the best interests of the producers. The New Zealand farmers' choice rested between compulsory control by means of a producers' board or working for the benefit of the shipping combine for the rest of their lives. 'One of the good results of the war was that it brought all shipping contracts to an end at the same time, so rendering combined action by producers now possible. Probably, that was the first thing the shipping combine would try to alter, an effort that producers must resist and fight to a finish. In that, wool, meat, and dairy producers must act together.

'Co-operation in California.

Co-operators in the fruit business turn naturally to California for examples of success in producers' combination, for there, to-day, and in America generally, agricultural co-operation has come to be accepted as a precept of progress. In deciduous crops, Californian orchardists have made a co-operative start with the citrus crop and, after many ups and downs, due to lack of solidarity among growers and the big fight put up by the middlemen, the movement was eventually consolidated, and has done more than anything else to stabilise prices and guarantee the producer a remunerative return for his fruit. Peach and apricot growers, raisin and fig growers, prune and olive growers have all been working along similar lines in recent years, but the deciduous fruits are so much more difficult to handle than the citrus that anything like a "get-together" movement among all the sections was for long declared to be impossible, yet by the latest mails from San Francisco we have received advices which demonstrate the fact that nothing is impossible to any body of producers who, under efficient leadership, set their minds on building up their industry by honest methods.

By careful organisation, the deciduous orchardists have formed what is virtually a combine, which hopes to control production, shipments, and prices by keeping as much as possible of the traffic out of the hands of the middleman, and, in the end, dealing directly with the consumer wherever possible. This, it is believed, will result in lower prices for peaches, apricots, cherries, pears, apples and other deciduous fruits, as it has resulted in the past in more reasonable cost to the consumer of oranges, lemons, and grape fruit.

The price of peaches has been fixed on a basis of present production costs, and present supply and demand, at about £12 a ton for No. 1 cling peaches; £6 a ton for No. 2 clings; £9 a ton for Lowell freestones, and £8 a ton for all other freestones. This price, the producers hold, will bring them a profit, while lowering the cost to the consumer, and, at the same time, guarantee disposal of the production to all the growers.

The Peach Growers' Association was organised only last December, and now represents about 62 per cent. of the annual peach crop of California, valued at these prices at £2,500,000 for 1922. Prices of peaches have varied from £22 a ton in 1920 to £7 last year, and the California Canning Peach Growers organised to put a stop to such fluctuations in price and to speculation in the fruit by middlemen, thereby robbing the consumer, and preventing the producer from getting a fair price. To do this, it was held necessary to provide a standardised price each year for the crop, which is reported as normal this year.

The prune crop, probably, will be the best and largest of all the deciduous fruit crops in California this year, according to the director of the California Prune and Apricot Growers' Association, which has been at work for many months endeavouring to standardise production, shipments, distribution, and prices, so that both producer and consumer may get a "square deal" on the crops with which it deals.

There is one vital point behind this great forward movement that needs to be stressed at the moment in Australia, and in Queensland particularly, and that is that its present progress was only made possible by the growers "signing up." Instead of talking volubly and vehemently about loyalty, rights, principles, and other more or less vague abstractions, the Californian growers have signed contracts to sell only through their own co-operative concerns, whatever the price, for a period of five years. Until the majority saw the wisdom of sticking together in this way, little progress was made, as the middleman was able to get in and play one off against another. When we are prepared to profit by the experiences of other and older countries, who have overcome disabilities and difficulties similar to those with which we are confronted to-day, the establishment of a sane selling system will surely follow.

Standardised Canned Products—The British Market.

Major E. A. Belcher, leader of the British Empire Exhibition delegation, speaking at Melbourne recently, advocated a more extensive and scientific advertising of Australian goods in Britain. He said that he believed that there was just as big a future for Australian canned and dried fruits in Britain as for Australian manufactured goods. Dealing with the question of unattractive packing and labelling of Australian goods, he said that California had forgotten more than Australia had begun to learn about the marketing of canned fruits, although the quality of the Australian article was equal, if not superior, to the Californian. He warned Australian meat exporters against competition from Uruguay in the future. Before long, Uruguay would be as formidable a rival as the Argentine. Australia should try and increase her output tenfold in the next few years. In fruit, if we could produce a definitely standardised article equal to what he had recently tasted, and could retain sufficient control over its export to prevent a bad article being exported, there was no limit to the amount Great Britain and Europe could absorb. Even at the cost of Government supervision, it was better to have some standardisation and have nothing but the best stuff going out of Australia.

Co-operation and Common Honesty.

The present season marks the turning-point for fruitgrowers, says California's Professor of Rural Institutions, who further declares that the growers should more than ever attempt to produce fruit to please the consumer, which, of course, places emphasis on quality production. He thinks that with the aid of co-operative marketing the growers will be able to secure a reasonable price for all fruit of the better grades, but questions whether, under any circumstances, they can secure a satisfactory profit from inferior grades. The influence of the "buyer's market," he believes, will be sure to make itself felt; and the producer of poor fruit will be the one to suffer.

In Australia, the same thing is becoming more and more evident. The public want plenty of fruit, but they are so often "taken down" by receiving inferior stuff that many of them refrain from buying more than a minimum. The retailer is sometimes to blame for this state of affairs, but just as often it is the grower who is at fault. He continues to grow and to send to the market fruit that is much below the standard set by consumers. When co-operation comes, in addition to getting better and more regular prices for the producer of good fruit, it will, undoubtedly, force the careless grower to improve his methods or to get out of the business. True co-operation is only for the honest farmer.

Dehydration.

The question of suitable and economical methods of artificially drying various fruits, vegetables, and maize is one that has for some time engaged the attention of the Minister for Agriculture (Hon. W. N. Gillies). It will be remembered that, last year, Mr. Quodling, the Director of Agriculture, went South to consult with the firm of Metcalfe and Sons, who designed and built the grain elevators for the New South Wales Government. This firm subsequently submitted plans and estimate of a comprehensive cleaning, drying, and storage scheme for maize in the Atherton District which is the largest maize-growing district in the State. The matter was fully considered at the time, but the estimate (£170,000 sterling) was considered prohibitive. Mr. Gillies took the opportunity recently of discussing this matter personally with Mr. Carter, the engineer to Messrs. Metcalfe and Sons. Mr. Gillies believes now that a less expensive scheme than the original one submitted would meet present requirements, and in view of the suggested Maize Pool, proper storage facilities will, in his opinion, be necessary, not only in the North, but at Kingaroy and other centres, and to this end further investigations are being made. On the subject of dehydration of fruits, which has made such rapid strides in California, Mr. Gillies, in the course of a recent Press interview, referred to an article in Bulletin No. 337, published by the University of California, entitled "Some Factors of Dehydrater Efficiency." This article was written by W. V. Cruess and A. W. Christie. The writers point out that in the course of the past two years more than 150 dehydraters have been built in California. There are also in existence not less than 150 driers of less modern design built before 1919. Some of these were erected merely as an insurance against rain damage, but many have been used in place of sun-drying, as in prune and apple drying. Many different types are represented and several different systems of heat production and heat conveyance are employed. Observations have been made upon many of these plants. In several cases, direct comparisons of important types were possible. Because of the improvements that are rapidly being made in the design, construction, and operation of dehydraters, this publication must be considered in the nature of a progress report. It is issued in the hope that the results, which in many instances are sufficiently conclusive, will be of value to operators and prospective purchasers or builders of dehydraters. Tables are furnished showing

the first cost of a number of different types of plants and the working cost of same, and it would appear from the estimates given that the actual cost per green pound of fruit runs from one-third of a penny to twopence; this, however, is for a short season of about two months. In the summary and conclusions, the writers point out that a completely equipped and satisfactory dehydrater can be built for \$500 (£100) or less per green ton capacity per twenty-four hours. They also say that the air-blast tunnel type of dehydrater is the most economical to operate in regard to both fixed charges and operative costs.

Co-operation amongst Poultrymen.

In a back street of Brisbane a little co-operative trading concern has taken root and gives every promise of developing into a strong and healthy growth. This co-operative effort has been launched by the N.U.P.B.A. Co-operative Society Limited which, in its turn, is an offshoot of the Queensland Branch of the National Utility Poultry Breeders' Association of Australia. There are many poultry clubs and societies in Queensland which exist solely for the show bench, but as far as is known the particular association referred to is the only one which has for its object the development and advancement, from the commercial standpoint, of the poultry business. For many years the Association has been steadily at work educating its members by lectures, demonstrations, and other practical means. The co-operative society was formed some little time ago and is already showing marked virility. Its object is to supply the wants of the poultry farmer and to handle his products to the best possible advantage. This year the society is making an effort to grapple with the surplus egg question and is now busily engaged preparing eggs for export. Large orders have been placed for the special cases and material required for the packing of the eggs for overseas carriage, and scrupulous care has been taken to ensure the eggs arriving in a condition which will do credit, not only to the society, but to the State. Size and quality have been taken into account and only the very best are allowed to be shipped. Each case is clearly marked "Produce of Queensland," and it is confidently hoped and believed that this experiment will make a distinctly favourable impression when the consignment is opened up in England. The first shipment was made recently, and this will be followed by others at regular intervals while the season of glut lasts. It is hoped, by this means, to gradually improve the position of the egg farmer, and that there is ample opportunity for improvement there is not the least doubt. With new laid eggs at 1s. per dozen, less commission, cases, railage, and other charges, the poultry farmer may well ask where is his basic wage coming from. Probably, there is no business which provides so many failures as does poultry farming, and there is no doubt that the poor returns for the labour and care involved are mainly responsible for this; and until the poultry farmer learns the stern lesson of organising, there can be little improvement. On every hand the advantages of successful organisation are apparent. It is not hard to remember when the dairy farmer had to be satisfied with 9d. per lb. or less for butter, and when the wheatgrower had to accept a price which would hardly pay working expenses in a bountiful season. The experience was bitter, but its teachings have not been in vain, and surely the egg-man is wise enough to see wherein his salvation lies. The bitter experience has been his for long enough, and now is his opportunity to make the move. The N.U.P.B.A. Society has stepped into the breach and is making an attempt to bring about the desired change. Its ideals are of the highest, and its success of national importance. Queensland is admirably adapted for poultry farming, and there is no reason why the industry should not grow to be one of the greatest in the land.

The Queensland Producers' Association.

Already over 5,000 farmers have been enrolled in 250 local producers' associations and these numbers are being added to largely every week. The advantages of a State-wide scheme of organisation, backed by statute, are so obvious and the powers that are now placed in the hands of the producer so wide, that it is difficult to imagine a reason why any farmer should remain outside the association. According to the Act governing the Queensland Producers' Association, the present Provisional Council must be superseded on 25th March next by a Council elected by district councils representing the local producers' associations. It is very important that every rural centre should have a voice in the election of councillors, because all primary producers will be subject to the provisions of the Act. The dates fixed for the completion of various stages of the elections are:—Nomination of candidates, 6th January; election of district councils, 3rd February; declaration of results, 17th February; first meetings of district councils, 3rd March. Full particulars are posted at all country railway stations.

Acknowledgment.

For the photographs of prize-winning cattle reproduced in this issue, we are indebted to the "Live Stock Bulletin."

General Notes.

QUEENSLAND COTTON PRODUCTION.

TABLE SHOWING THE AREA, PRODUCTION, AND EXPORT OF COTTON FROM
QUEENSLAND FROM 1860-1921.

Year.	Area.		Produce.		Exports.	
	Acres.		Lb.		Lb.	
1860	..	14	Not collected.		..	..
1861	..	395	..		2 bags	4
1862	..	392	..		14,344	1,423
1863	..	2,021	..		31,557	3,056
1864	..	479	..		38,730	4,186
1865	..	478	..		145,820	12,197
1866	..	2,884	..		196,704	19,218
1867	..	8,149	..		10,568*	400
1868	..	11,454	..		412,941	26,631
1869	..	14,427	..		1,809,628	68,929
1870	..	14,674	..		1,118,899	51,217
1871	..	12,963	..		1,630,755	73,437
1872	..	12,002	..		2,567,318	78,209
1873	..	9,663	..		1,486,987	59,774
1874	..	4,149	..		1,375,216	48,673
1875	..	1,674	..		979,875	32,819
1876	..	573	..		314,454	8,162
1877	..	276	90,450		137,812	3,541
1878	..	37	10,500		221,689	6,940
1879	..	105	30,423		43,532	1,216
1880	..	619	125,736		26,261	664
1881	..	973	183,488		108,260	3,581
1882	..	1,082	243,232		266,289	8,839
1883	..	316	70,020		248,029	7,932
1884	..	49	12,050		80,689	3,430
1885	..	50	14,968		28,856	1,066
1886	..	15	2,100		19,241	608
1887		1,548	45
1888
1889	..	1	7		..	..
1890	..	16	5,315		..	..
1891	..	90	48,746		15,396	488
1892	..	717	212,370		38,618	1,061
1893	..	191	29,353		88,559	1,921
1894	..	100	54,801†		1,426	56
1895	..	494	269,110		3,860	105
1896	..	280	141,032		..	..
1897	..	48	19,977		..	..
1898	..	1	50		..	..
1899
1900
1901
1902	..	8	1,600		..	..
1903	..	2	1,500		..	..
1904	..	30	25,832		..	..
1905	..	171	113,008		..	..
1906	..	138	77,381		20,450	583
1907	..	300	109,294		71,053	1,259
1908	..	540	117,521		15,561	440
1909	..	509	129,245		11,832	457
1910	..	460	151,438		10,531	655
1911	..	605	186,894		2,267‡	141

QUEENSLAND COTTON PRODUCTION—*continued.*TABLE SHOWING THE AREA, PRODUCTION, AND EXPORT OF COTTON FROM QUEENSLAND FROM 1860-1921—*continued.*

Year.			Area.	Produce.	Exports.	
			Acres.	Lb.	Lb.	£
1912	..	..	441	150,414	12,880	650
1913	..	..	214	35,230	82,734	2,147
1914	..	..	134	20,336	7,583§	372
1915	..	..	72	12,238	..	..
1916	..	..	75	24,264	5,217	196
1917	..	..	133	118,229	..	..
1918	..	..	203	166,458	..	..
1919	..	..	72	37,238	406	7
1920	..	..	166	57,065	..	..
1921	..	..	1,944	940,126	..	..
			858	Unproductive	..	..

* Unginned.

† Previously recorded as ginned; now unginned.

‡ The collection of Interstate transfers was discontinued by the Customs authorities in September, 1910.

§ Six months. From 1914 the export figures are for the year ending 30th June.



PLATE 78.—FIFTEEN-MONTHS-OLD BADILA CANE, CUTTING PROBABLY AT THE RATE OF FIFTY-FIVE TONS PER ACRE, GROWN ON MR. W. TOATES'S FARM, N.Q., ON A SMALL PATCH OF NEW SCRUB LAND.

Answers to Correspondents.

Paralysis in Young Pigs.

D.B. (Toogoolawah)—

Your pigs are evidently suffering with paralysis, which may be brought on by several causes:—viz., rheumatism, worms in the kidneys and surrounding parts, or by overfeeding young pigs on an exclusive diet of corn and water.

Treatment ("Pig Raising in Queensland," E. Graham and H. C. Quodling, p. 46):—If due to rheumatism, see that the pigs are housed at night in a dry place, and allowed to sleep on wood flooring instead of on concrete or earth. Give daily, salicylate of soda 15 to 30 grains, and bicarbonate of potash 1 to 2 drachms, in the food or as a drench.

If due to worms, give, in the food or as a drench: One teaspoonful of oil of turpentine, 20 drops of liquid perchloride of iron, and three (3) or four (4) oz. of raw linseed oil. This is sufficient for 50 lb. body weight. It should be given after the animal has been fasting for some hours, and can be repeated several times, with an interval of three or four days.

When due to feeding, as mentioned above, stop the corn, and give once daily in a mixed diet, or in milk, 1 dessertspoonful of the following powder for every 100 lb. body weight, after it has been well mixed and powdered:—Sulphur, 2 oz.; sodium bicarbonate, 4 oz.; sodium sulphate, 2 oz.; black antimony, 2 oz.; sulphate of iron, 1 oz.; wood charcoal, 2 oz.

Lice on Pigs.

"TINGOORA"—

Pigs are often troubled with a species of louse commonly known as the pig-louse (*Haematopinus suis*). This species is an active blood-sucker, and is among the largest of lice, measuring one-fifth inch in length. It is a flat, oval insect, with a long, narrow head, and its legs end in long claws, which enable it to move rapidly among the bristles of the pig. The pig-louse spends its entire life on the body of the host, and attaches its eggs or "nits" to the bristles. While it may occur on all parts of the body, the favourite spots are within the ears, behind and in front of the ears, on the breast, and in the armpits.

For the destruction of these parasites, dipping, spraying, or hand-dressing may be resorted to. Dipping is usually more convenient in the case of young pigs, and spraying for adult ones. Various substances may be used as dips or sprays.—Smythe recommends Jeyes' fluid, diluted 1.60 with water. Other substances are creoline (5 per cent. solution), and nicotine extracts, diluted according to the directions of the manufacturers. Treatment should be repeated after about a week, in order to destroy lice that may hatch out from remaining eggs. The sleeping quarters of pigs should be thoroughly cleaned and disinfected at the same time as dipping or spraying takes place. For hand-dressing, the parts infected with nits and lice may be rubbed with a cloth soaked in paraffin or a mixture of paraffin and linseed oil (1:1). An ointment prepared by thoroughly mixing equal quantities of paraffin, sulphur, and lard is also effective.

If the pigs are running in enclosed camps a little crude oil, sufficient to form a thin layer on top of the water, may be poured into the wallow about every ten days. American pig farmers find this a useful method of checking lice on pigs. Another method is to tie a sack or other coarse cloth around a post at a proper height, so that the pigs may rub against it; the sack is periodically saturated with crude oil.

Green Cane Top Silage.

H.W. (Mackay)—

The Director of Sugar Experiment Stations (Mr. H. T. Easterby) advises as follows:—

Experiments in this direction were carried out by the Bureau at the Sugar Experiment Station, Bundaberg, and this silage is now made there every year. The feeding value is low, as will be shown by the following analyses supplied by the Agricultural Chemist, Mr. J. C. Brännich. It is an assistance during dry weather, mixed with other foodstuffs:—

Sugar-cane Tops Ensilage.

	Per cent.
Moisture	78.09
Dry matter	21.91
Crude protein	1.34
True protein	0.66
Ash	2.72
Crude fibre	8.87
Crude fat	0.79
Carbohydrates (etc.) by diff.	8.19
<hr/>	
Total nitrogen	0.214
Proteid nitrogen	0.105
Amido nitrogen	0.075
Ammonia	0.034
Acidity as lactic acid	1.73

The food value of this ensilage is extremely low as compared with corn silage, or Soudan grass silage, &c., on account of the low protein contents.

Nitrogenous concentrated foodstuffs will have to be used in combination in order to get complete rations for stock.

Marketing Intelligence.

W.L. (Ambrose)—

A system of supplying complete and authentic market information direct to Local Producers' Associations at least once a week is now being devised by the Council of Agriculture. Obviously, a Journal published only once a month is of no great value as a vehicle for marketing intelligence. Timeliness and *absolute accuracy* are, of course, essential in market reports.

Tree Lucerne.

J.H.Ry. (Pittsworth)—

Tree lucerne seed may be obtained from most seedsmen. The retail price is about 1s. per oz. Seed should be soaked in water before sowing, either in boxes or in the permanent position. It is of fairly rapid growth, reaching 10 or 12 feet in the course of about three years, and bears a profusion of white pea-shaped flowers, useful where bees are kept. It stands frost and should do well on the Downs. As a fodder it is an "also ran" compared with lucerne proper, which is easily the king of fodders on the Downs.

Lime-Sulphur Wash.

"OLD SUBSCRIBER" (Edmonton)—

A concentrated solution of lime and sulphur is now manufactured in quantity, and is sold reasonably and of special strength. It is considered generally more satisfactory for orchardists to buy the concentrated mixture and dilute it to their own requirements than to go to the trouble (and it is a disagreeable job!) of making it themselves. See "Citrus Culture" (A. H. Benson) 7th Edition, p. 69, a copy of which is being posted direct.

To Soften Hides.

W.C.B. (Wondai)—

There is no special process for softening untanned hides. The usual tannery practice is to soak them in water for, say, twenty-four hours.

Coffee Berries.

“YARWUN” (Yarwun)—

We do not know of any rapid process of removing the thin inner skin attached to coffee berries. When dry, this thin skin is not detrimental to the berry as far as roasting is concerned.

Notice of Scrub Burns.

“FARMER” (Mount Larcom)—

It is necessary to notify your neighbours as to your intention to fire your falling and advise them of the date upon which you have decided to burn. You would naturally exercise the greatest possible care in keeping the fire within bounds. You would certainly be responsible for any damage to neighbours' property arising out of the careless use of fire and neglect to give reasonable notice and to take all reasonable precautions to prevent a fire spreading.

Operations of Rural Banks and Credit Systems.

T.F. (Boonah)—

A series of articles on rural banking systems and co-operative credit associations are now in course of preparation for publication in the Journal.

Cassaba Melon Seeds.

We are very grateful to the subscribers who so generously responded to our request for new seeds for this season's sowing. Their kindness and courtesy have enabled us to meet all requests on our list.

Cotton Photograph.

F.A. (Hut Creek, Ambrose)—

The photograph of your cotton field was not sharp enough, and was therefore quite unsuitable for reproduction. Sorry. When next you take a picture send us the negative, from which we shall be able to take a print up to our requirements. Thanks.

Farm and Garden Notes for November.

FIELD.—The recent unfavourable weather experienced throughout the wheat areas must naturally affect the ultimate yields. Areas in many parts of the Maranoa are already beyond rain redemption. Harvesting on the Downs may be expected to commence in the latter part of October; but, unfortunately, it is not likely to extend over any lengthy period. Growers who have suffered a seasonal setback would be well advised to push on with recultivation for the purpose of making a saver out of cotton. From mid-October until the beginning of November is the cotton planting season, and delay in districts usually subject to early frosts means a risk of failure to secure a cotton rake-off.

Farmers are commencing to realise that quick-maturing wheats which possess a degree of rust resistance are more dependable than the slow-growing and often rust-susceptible kinds, which are gradually giving place to these and mid-season varieties.

Growers are advised to make every preparation to work up the surface of the ground immediately after the removal of their crops, so that the soil may be put into good condition to receive any rain which falls, the conservation of which is the best guarantee for the success of the next succeeding crop. Such initial preparation also encourages the early growth of all foreign and weed seeds, and permits of their eradication by the implements used to produce the desired soil mulch. In such manner paddocks are kept clean and the purity of crops is maintained. The careful preparation of areas intended for maize-planting cannot be too strongly impressed upon growers. Deep and thorough ploughing, followed by cross-ploughing and subsequent cultivation of the soil, must precede sowing if success would be attained; and all efforts must be concentrated to obtain a good surface mulch. Failure to follow up the subsequent sowings by harrowing prior to the appearance of the young plant conduces to weed growths and very often entails, by neglect of this operation, subsequent hand-hoeing between the plants in the drills. Harrowing should be discontinued before the plant breaks through the surface, otherwise damage will accrue to the tender shoots of the young plant. When the young maize plant has hardened up it may, with advantage, be lightly harrowed in the direction of the drills, but such practice must discontinue once the plant has attained a height of 6 inches. Close cultivation by inter-row cultivation implements is necessary after every shower to conserve moisture and to prevent weed growth, care being taken to ensure each cultivation being shallower than the preceding one, and so prevent damage to the root system of the plant, which is extensive. Inter-row cultivation should cease with the advent of the cob on the plant; and, if proper attention has been given to the crop, it should, at this period, be unnecessary. Where crops are planted on the check-row principle, inter-row cultivation is facilitated, and more even crops result.

The French millets (red and white), owing to their rapid maturing qualities, form excellent intermediate or supplementary crops, and are suitable for present sowing. Their value for fodder and seed purposes is worthy of more general recognition at the hands of the average farmer.

Past dry periods have impressed upon us the necessity of providing during good seasons against the return of less favourable ones, and in this connection the cultivation of quick-growing fodder plants appeals to us. Many varieties of useful classes of fodder can be cultivated over a large portion of this State; chief of which, perhaps, are the sorghum family for grain and fodder purposes. Of the latter, Sudan grass has much to commend it, and is fast becoming one of the most favoured by stockowners. Grain sorghums, of which Feterita, Red Kafir, and the various Milos are examples, should occupy a more prominent position for purposes of horse and pig feeding, and are particularly suited to those localities which are unsuitable for maize production. Some varieties of sorghum have strong frost-resisting qualities, and lend themselves to those localities where provision for some form of succulent fodder is necessary during the winter months.

Orchard Notes for November.

THE COASTAL DISTRICTS.

November is somewhat of a slack month for fruit in the coastal districts, as the citrus crop, excepting a few Valencia Late oranges, off-season lemons, and a few limes, is over. Pineapples are also scarce, as the late spring crop is finished, and there are only comparatively few off-season fruits ripening. The main summer crop of fruit in the principal producing districts is only in the flowering stage, though that in the more tropical parts is ready for marketing. It is also a slack month for bananas, as the summer fruit is not yet fully developed, and the bunches that make their appearance are usually poor. They have been slow in developing on account of the comparatively cool weather of winter and early spring, when the suckers were more or less at a standstill. Young suckers should, however, be making vigorous growth now, and the plantation will require constant attention to prevent the stools being overcrowded with too many suckers. Keep the land well worked and free from weeds of all kinds, as good growth now means good bunches in the autumn and early winter. Where there is a danger of the soil washing badly with heavy rain, rows of Mauritius, velvet, or other suitable beans should be planted at right angles to the fall of the land, as the growth they make will tend to hold the soil and thus save any from being washed away. When planting beans of any kind, either to prevent washing or for green manuring, don't forget to manure them, as thereby you will get a much greater yield, and as none of the manure is removed from the soil, as the crop is allowed to lie and rot on the ground, it is all made use of eventually by the permanent crop.

A good all-round manure for a bean crop is a mixture of 1 cwt. of sulphate of potash and 4 cwt. of basic superphosphate or finely-ground phosphatic rock to the acre, and, if the soil is deficient in lime, a dressing of not less than half a ton to the acre will be found very beneficial, as all leguminous plants require lime to yield their maximum return both of haulm and pulse. The pineapple plantations require to be kept in a state of thorough tilth, and no weeds must on any account be allowed to grow. If blady grass makes its appearance it must be stamped out, as once it gets established in the rows it is only a short time before it takes control, and the plantation is ruined, so that it can only be brought back into profit by taking out the pines, killing the blady grass, and, after thoroughly and deeply working the land, manuring it and replanting.

The planting of pineapples and bananas can be continued throughout the month, taking care to see that the land is properly prepared and that the advice given in previous monthly notes is followed. Young pawpaw plants that have been raised in the seed bed can be set out now, as also can young passion fruit. Citrus orchards require to be well looked after; the ground must be kept in a state of thorough tilth, and if the trees show the slightest sign of distress, owing to lack of moisture in the soil, they must be given a thorough irrigation if water is available for this purpose. The trees should be carefully examined from time to time so as to note when young scale insects of any kind are hatching out, and when this is noted they should be sprayed with a weak emulsion of a miscible oil consisting of one part of oil in forty parts of emulsion, as this is quite strong enough to kill any young scales before they develop their protective covering. As stated in these notes previously, no oil sprays should be used when the trees are suffering from lack of moisture, as

they are then likely to do more damage than good to citrus trees. If scale insects are very bad, and it is important that the trees are sprayed, a weak lime-sulphur spray, or even a soap and tobacco or weak resin wash, will kill the young scales as they hatch out. In the earlier districts a keen lookout must be kept for the first appearance of the mites, which are the direct cause of the darkening of the skin of the fruit known as "Maori." The first indication of the trouble is that when the sun is shining on the young fruit, it appears to be covered with a grey dust, and if the fruit is examined with a good lens it will be seen to be covered with large numbers of small yellowish slug-like insects which are living on the skin. Spraying with sodium or potassium sulphide washes, as recommended by the Department, or with a weak solution of lime sulphur, will destroy these insects and prevent the fruit from turning black. Borers of all kinds should be looked for and destroyed wherever found. Water sprouts, if not already removed, should be cut away. Vines will require careful attention, and the vineyard should be kept in a state of thorough cultivation. Spraying for Downy mildew and black spot should be continued, if necessary, as well as sulphuring to prevent oidium.

Fruit fly must be systematically fought whenever seen, and special care must be taken to gather and destroy any early ripening peaches or other fruits that may be infested. If this is done systematically by all growers, as provided by the Diseases in Plants Act, there will be many less flies to attack the later crops of mangoes and other fruits.

Leaf-eating insects of all kinds should be systematically fought wherever seen, by spraying with arsenate of lead, and potatoes and tomatoes should be sprayed with a combined spray consisting of Bordeaux or Burgundy mixture and arsenate of lead, so that diseases such as early blight and Irish blight may be prevented and leaf-eating insects, which frequently cause very heavy losses to these crops, be destroyed.

THE GRANITE BELT, SOUTHERN AND CENTRAL TABLELANDS.

Keep the orchards and vineyards in a thorough state of cultivation, so as to keep down all weed growth and conserve moisture in the soil. This is important, as, if a long spell of dry weather sets in, the crop of summer fruit will suffer severely from the lack of moisture. Citrus trees should be irrigated where necessary, and the land kept in a state of perfect tilth. Spraying for codlin moth should be continued, and all pip fruit trees must be bandaged the beginning of the month; further, the bandages must be examined at frequent intervals and all larvæ contained in them destroyed. The neglect to spray thoroughly and to attend to the bandages properly is responsible for the increase in this serious pest in the Granite Belt, and growers are warned that they must pay more attention to the destruction of this pest if they wish to grow pip fruits profitably. Fruit fly may make its appearance in the cherry crop; if so, every effort should be made to stamp out the infestation at once, as, unless this is done, and if the fly is allowed to breed unchecked, the later ripening crops of plums, peaches, apples, pears, apricots, and Japanese plums are bound to become more or less badly infested. Combined action must be taken to combat this, the most serious pest of the Granite Belt, and growers must realise that, unless they take this action and see that careless growers do not breed the fly wholesale, they will never keep it in check, and it will always be a very heavy tax on their industry. Rutherglen bug is another serious pest in this district, and is propagated by the million by careless orchardists. The best remedy for this pest is to keep the orchard clean and free from weeds. Brown rot in fruit should be watched for carefully and, on its first appearance in a district, all ripening fruits should be sprayed with the sodium sulphide wash.

All kinds of leaf-eating insects should be kept in check by spraying with arsenate of lead, and all grape vines, potatoes, and tomatoes should be kept sprayed with Bordeaux or Burgundy mixture, the former for black spot and downy mildew, and the latter for early and late (Irish) blight.

ASTRONOMICAL DATA FOR QUEENSLAND.

TIMES COMPUTED BY D. EGLINTON, F.R.A.S.

TIMES OF SUNRISE AND SUNSET.

AT WARWICK.

1922.	OCTOBER.		NOVEMBER.		DECEMBER	
Date.	Rises.	Sets.	Rises.	Sets.	Rises.	Sets.
1	5.34	5.50	5.4	6.8	4.50	6.32
2	5.33	5.51	5.3	6.9	4.50	6.33
3	5.32	5.52	5.3	6.9	4.50	6.34
4	5.31	5.52	5.2	6.10	4.50	6.35
5	5.29	5.53	5.1	6.11	4.50	6.36
6	5.28	5.53	5.0	6.12	4.51	6.36
7	5.27	5.54	5.0	6.12	4.51	6.37
8	5.25	5.54	4.59	6.13	4.51	6.38
9	5.24	5.55	4.59	6.14	4.51	6.38
10	5.23	5.55	4.58	6.15	4.51	6.39
11	5.22	5.56	4.57	6.16	4.52	6.39
12	5.21	5.56	4.57	6.16	4.52	6.40
13	5.20	5.57	4.56	6.17	4.52	6.40
14	5.19	5.57	4.56	6.18	4.52	6.41
15	5.18	5.58	4.55	6.19	4.53	6.41
16	5.17	5.59	4.55	6.20	4.53	6.42
17	5.16	5.59	4.54	6.20	4.53	6.43
18	5.15	6.0	4.54	6.21	4.54	6.44
19	5.14	6.0	4.53	6.22	4.54	6.45
20	5.13	6.1	4.53	6.23	4.55	6.45
21	5.12	6.2	4.53	6.24	4.55	6.46
22	5.11	6.2	4.52	6.24	4.56	6.46
23	5.10	6.3	4.52	6.25	4.56	6.46
24	5.9	6.3	4.51	6.26	4.57	6.47
25	5.8	6.4	4.51	6.27	4.57	6.47
26	5.8	6.5	4.51	6.28	4.58	6.47
27	5.7	6.6	4.50	6.28	4.59	6.48
28	5.6	6.6	4.50	6.29	5.0	6.48
29	5.5	6.7	4.50	6.30	5.0	6.49
30	5.5	6.7	4.50	6.31	5.1	6.49
31	5.4	6.8	...	...	5.1	6.49

PHASES OF THE MOON, OCCULTATIONS, &c

The times stated are for Queensland, New South Wales, Victoria, and Tasmania when "Summer" Time is not used.

6 Oct. ○ Full Moon 10 58 a.m.
 14 " ☾ Last Quarter 7 55 a.m.
 20 " ● New Moon 11 40 p.m.
 27 " ☾ First Quarter 11 26 p.m.

Apogee on 5th at 6 a.m.

Perigee on 20th at 2.42 a.m.

An occultation of Delta Tauri will take place on 10th October about a quarter past 9. With binoculars or a small telescope this will be an interesting sight as the Moon will be in the group of stars called the Hyades, of which Aldebaran is the principal star.

5 Nov. ○ Full Moon 4 36 a.m.
 12 " ☾ Last Quarter 5 52 p.m.
 19 " ● New Moon 10 6 a.m.
 26 " ☾ First Quarter 6 15 p.m.

Perigee on the 17th at 10.6 a.m.

Apogee on the 29th at 5.24 a.m.

Delta Tauri will again be occulted about 3 a.m. on the 7th; also Eta Virginis on the 15th about 9.30 p.m.; and the planet Saturn on the 16th about 5 p.m. when the Moon and it are far below the horizon.

4 Dec. ○ Full Moon 9 24 p.m.
 12 " ☾ Last Quarter 2 41 a.m.
 18 " ● New Moon 10 20 p.m.
 26 " ☾ First Quarter 3 53 p.m.

Perigee on 15th at 1.30 a.m.

Apogee on 27th at 2.6 a.m.

Delta Tauri will be occulted about 10 a.m. on the 4th, when the Moon and star are below the horizon, but on the 31st, when it will be occulted about the time of sunset, an interesting observation of the star's reappearance may be possible in the twilight.

For places west of Warwick and nearly in the same latitude, 28 degrees 12 minutes S., add 4 minutes for each degree of longitude. For example, at Inglewood, add 4 minutes to the times given above for Warwick; at Goondiwindi, add 8 minutes; at St. George, 14 minutes; at Cunnamulla, 25 minutes; at Thargomindah, 33 minutes; and at Oontoo, 43 minutes.

The moonlight nights for each month can best be ascertained by noticing the dates when the moon will be in the first quarter, and when full. In the latter case the moon will rise somewhat about the time the sun sets, and the moonlight then extends all through the night; when at the first quarter the moon rises somewhere about six hours before the sun sets, and it is moonlight only till about midnight. After full moon it will be later each evening before it rises, and when in the last quarter it will not generally rise till after midnight.

It must be remembered that the times referred to are only roughly approximate, as the relative positions of the sun and moon vary considerably.

[All the particulars on this page were computed for this Journal, and should not be reproduced without acknowledgment.]

Queensland

Department of Agriculture and Stock

Volume XVIII



NOVEMBER, 1922

Queensland Agricultural Journal



REGISTERED AT THE GENERAL POST OFFICE, BRISBANE,
FOR TRANSMISSION BY POST AS A NEWSPAPER.

Edited by
J. F. F. REID

DIABOLO SEPARATOR

SUCCESSFUL
DAIRYMEN
PREFER THE
" DIABOLO "



TAKE A
DIABOLO
as Your Choice

Over Two Million successful Dairy-
men name the "DIABOLO" as
their choice. They find that the
perfectly balanced "Diabolo" Bowl
produces more cream than any other
Separator—that its accuracy and simplicity make it a sure profit earner
Very simple in construction—easy to work and keep clean—it is a
perfect skimmer. Dairymen who use it get every particle of Cream a
their cows produce. Liberal Extended Terms Available.

DIABOLO SEPARATOR CO. LTD.

CREEK STREET

...

BRISBANE

Descriptive Booklet Posted Free on Request

DIABOLO

FOR THE SUCCESSFUL DAIRYMAN

TAYLOR'S SEED MAIZE

OUR New Season's Stocks of Seed Maize are now ready.
We have all the leading varieties, including Yellow Horse-
tooth, Yellow Dent, Ninety Day, White Hickory King, Golden
King, etc. Each of these are beautiful samples, specially selected
for seed purposes, all topped and tailed, and thoroughly reliable.

IF INTERESTED, WRITE US !

For present planting we can offer you—

JAPANESE MILLET, WHITE PANICUM, Ordinary
PANICUM, GIANT PANICUM, PASPALUM, RHODES
GRASS, SACCALINE, IMPHEE, WHITE DUTCH
CLOVER, COUCH GRASS, etc.

SUDAN GRASS.—One of the most valuable summer-growing
fodder crops for grazing purposes. Fine stocks on hand of first-
class germinating seed. Try a small quantity for yourself, and you
will prove its worth,

COWPEAS for green
manuring purposes.

VEGETABLE and
FLOWER SEEDS of
every description for
the farm and garden.

CHAS. TAYLOR & CO.
"The
Leading
Seedsmen,"
110-116 ROMA STREET,
BRISBANE.

Registered at the General Post Office for Transmission by Post as a Newspaper.]



THE
QUEENSLAND AGRICULTURAL JOURNAL

ISSUED BY DIRECTION OF

THE HON. THE SECRETARY FOR AGRICULTURE.

EDITED BY J. F. F. REID.

VOL. XVIII. PART 5.

NOVEMBER.

By Authority:
ANTHONY JAMES CUMMING, GOVERNMENT PRINTER, BRISBANE.

1922.



—TRUE
VALUE

PIKE BROTHERS'
Famous Khaki
DINGO MOLE
RIDING
TROUSERS

40/-

Per Pair

"THERE'S NONE SO SERVICEABLE"

DINGO MOLE defies the Saddle rubbing—it has an obstinate surface—a quality that will not wear out. They will wear so long that you'll almost forget the day you bought them.

¶ Then there is the finer Tailoring that accounts for much—the superior trimmings help too, and the fitting, well—skilful cutting gives that correctness for saddle comfort and service, which is all to the "Man of the Saddle."

WRITE TO
DESK A.J.

SEND FOR PATTERNS
AND SELF-
MEASUREMENT
FORM

PIKE BROTHERS
LIMITED
BRISBANE

Townsville

Toowoomba

QUEENSLAND AGRICULTURAL JOURNAL

VOL. XVIII.

NOVEMBER, 1922.

PART 5.

ORGANISATION OF THE AGRICULTURAL INDUSTRY.

The Queensland Producers' Association.

Monthly Record of Progress and Achievement.

The last Regular Meeting of the Council of Agriculture was held in the Council Room, Teachers' Training College Building, Turbot street, Brisbane, on 19th October. Subjoined is a Record of Proceedings covering many matters of first importance to the Farming Industry.

Attendance.

In the absence of the President (Hon. W. N. Gillies), the chair was taken by the Vice-President (Mr. J. Purcell).

There were present: Messrs. J. W. Davidson, E. Graham, T. Flood Plunkett, W. Purcell, H. Keefer, F. M. Ruskin, H. I. H. Ross, W. Ranger, S. J. Howe, J. T. Tod, F. J. Morgan, T. Muir, R. Swan, T. A. Powell, W. G. Bachelor, C. H. Pritchard, C. V. Hives, the Director (L. R. Macgregor), and the Secretary (J. F. McCaffrey).

ADMINISTRATIVE COMMITTEE.

Expert Accountancy Committee.

In connection with the Expert Committee to be appointed to consider the question of a uniform accountancy system for butter and cheese factories, Mr. A. E. Neville, Standard Dairy Company (representing butter factories), Mr. Robinson (Messrs. Robinson and Jolly, Public Accountants), and Mr. H. Russell (Department of Agriculture and Stock) were appointed to act.

Farmers' Convention—General.

Draft Orders in Council covering the election of District Councils, and generally applying the provisions of the Primary Producers' Organisation Act, including the constitution of the Council of Agriculture, was deferred to the next meeting.

Association deprecated the action of the Commonwealth Government in allowing fertilisers to be exported from Australia while the need for dried blood in Queensland is urgent, and the fact that many foreign fertilisers not containing blood had been bought and used with very poor results. The report submitted stated that legislation is provided under the Queensland Fertilisers Acts of 1914 to 1916, embodying provisions for the protection of producers, but it was doubtful whether the provisions are being availed of to the fullest extent. As the Act applies merely to the sale of fertilisers by dealers in Queensland, there is possibility of its evasion by the importation of fertilisers from other States.

The report contained recommendations, which the Council approved, to the effect that the Government appoint a man of ability and experience to act as inspector of fertilisers; that the Government be asked to bring about collaboration between State Governments with a view of obtaining uniform legislation covering fertilisers; that a suggestion be made to the Department of Agriculture to redraft the regulations with a view to registration and classification of country agents, canvassers, and dealers; that a lecture be prepared, illustrated by lantern slides, for deliverance by District Agents to all Local Producers' Associations covering the whole question of fertilisers.

Proposed Arrowroot Pool.

The Director reported that he had attended a meeting of arrowroot growers at Beenleigh, on the 14th October, when it was unanimously resolved by the growers present to request that a pool, in accordance with the Primary Products Pools Act, be established for the arrowroot industry. The Committee agreed with the general principles of the scheme, and the Council decided to recommend that steps be taken to establish a pool to bring about the necessary measure of control in the hope of saving the industry.

General.

The Council noted that—The question of improving the conditions of maize growers is now receiving the personal attention of the Director, and that a report thereon will be furnished to the Council at an early date.

The question of reducing the carrying capacity of railway trucks, from 6 to 4 tons, be referred to the Transport Committee for favourable consideration.

The Director is investigating the possibility of applying the principle of co-operative distribution to Agricultural Machinery, and will furnish the Council with the result of his investigations in due course.

In connection with the resolution recently submitted by the Inverlaw Local Producers' Association, urging the Council to make the destruction of prickly-pear in infested areas a Commonwealth liability, the Federal and State Governments be requested to encourage settlers in their efforts to eradicate prickly-pear by exempting from income tax money spent for that purpose by *bonâ fide* settlers.

That the Inverlaw Local Producers' Association be advised of the action taken by the Council, and informed at the same time of the experiments being conducted by scientists under the direction of the Bureau of Commerce and Industry.

In connection with the recent suggestion received from the Moffatdale Local Producers' Association, to the effect that the Council consider the advisability of erecting a storage shed in Rockhampton for facilitating the marketing of produce, the District Agent be requested to interview the secretary and furnish the Council with full particulars as to the requirements of the Association.

In view of the statements made in a letter dated 15th ultimo from the Millman Local Producers' Association regarding the damage done to crops by wallabies, the Department of Agriculture be requested to furnish full information concerning the operations of the Dingo and Marsupial Destruction Act.

The Department be requested, at the same time, to advise as to the possibility of bringing wallabies within the scope of the Act.

THE PHYSIOGRAPHY OF NORTH AUSTRALIA—III.

BY DR. H. I. JENSEN, Geological Survey, Brisbane.

REVIEW OF INDIVIDUAL DISTRICTS—continued.

HODGKINSON-MAYTOWN BELT.

Physiography.—This area, commencing north of the Marceba-Dimbula granite mass, near the old Minnie Moxham gold mine, consists largely of very rugged and very dry country. There are few springs and no permanent waters except the perennial Mitchell River.

Slates, steeply inclined or on end, and hard felspathic greywackes, which have frequently the appearance of mirolitic trachyte and syenite, are the most plentiful rocks. They weather into rounded hillocks and steep ridges covered with a pebbly rubble which is very severe on horses' feet, giving very bad travelling. Roads in this type of country wash out badly in the wet season.

The petrography of Kingsborough and that of Maytown are almost identical, as are also the physical features, in spite of the great distance between them. The most even country in the belt are the granite areas and the larger alluvial patches.

The Hodgkinson River at and above Mulligan, and the Palmer River at and above Maytown, run in rocky gorges which contain water only in the wet season and a few months after.

Rainfall.—The average rainfall is 39.7 inches per annum at Maytown and 35.5 inches per annum at Thornborough, practically all wet-season rains.

Soils.—The soils are in general poor, though some of the slate alluvials are very fertile if only they get water enough.

Vegetation.—On the granite patches where a fair depth of soil obtains, box (*E. microtheca*), blue gums (*E. tereticornis*), and bloodwoods (*E. terminalis*) thrive. On the greywackes throughout the belt ironbark is in almost exclusive command, and becomes very monotonous to the eye. The narrow-leaved species alone was noticed in the southern portion of the belt, but at the Maytown end a lemon-scented species (*E. staigeriana*) with a more rounded leaf is very abundant as well on the white greywackes. On the alluviated flats of greywacke origin we have also *Eucalyptus alba* and *E. grandifolia*, and near permanent water pandanus and *E. papuana*.

CHILLAGOE-O.K.-PALMER BELT.

Physiography.—The scenery and vegetation of this belt is somewhat varied. The patches of Featherbed porphyry which occur, especially down the Walsh River, constitute rough, mountainous, bouldery country. The limestone areas are partly composed of well-grassed plain and partly of jagged pinnacles. The granites are very varied in chemical composition, and their scenery is accordingly varied. The greatest part of the Chillagoe granite area is an evenly eroded plain, but there are patches of hard, fine-grained, very silicious granite which resist erosion to such an extent as to survive as steep high cones whose slopes are bestrewn with huge spheroidal boulders. These hills are known as the Metal Hills, some of the earlier surveyors having mistaken this blue silicious granite for basalt or blue metal. Between the Walsh River and the Mitchell River we also have an extensive area capped with sandstone residuals, taking the form of flat-topped ranges and mesas lined with mural escarpments which are unscalable except at a few points. These mesas and ranges are similar to Mount Mulligan. Owing to the fact that this mesa belt consists of disconnected blocks, the road from Mungana to O.K. winds through it without having to climb these ranges.

Climate.—The climate of the Chillagoe belt belongs to the semi-arid type. The average annual rainfall amounts to about 35 inches, falling in the four or five wet season months. The limestone country has but few springs, though on the whole it is better watered than the other formations, and big subartesian and well supplies are obtainable by sinking almost anywhere in the limestone. Chillagoe Creek is a permanently flowing rivulet fed by springs, but the finest stream in the peninsular part of North Queensland is undoubtedly the Mitchell River. That river, fed by springs in the coastal hills and scrub rains about Mount Molloy, is overflowing and teeming in fish.

Soils.—The alluvial and limestone soils of the belt are fairly good, but the other formation yield only poor soil. High mineralisation in the limestone formations, together with the leaching of surface soil which takes place in the heavy wet, are factors which prevent the limestones here from forming rich black loams like those of the Barkly Tableland. The limestone soils are mostly red loams in this district; they are easily tilled, and would be very productive if irrigated.

Natural Vegetation.—On the limestone country we get an abundance of calciphile trees, such as bauhinia, mimosa, corkwood, ironwood, &c., interspersed with the more

widespread species of eucalypt like *E. grandifolia*, *E. alba*, and, in damp places, *E. papuana* and *E. terminalis*. On the jagged limestone pinnacles the bottle tree, figs, and a variety of prickly bushes and vines flourish. On the granite country we have *E. grandifolia*, *E. microtheca* (box), ironwood, and *E. terminalis* (bloodwood) on the better classes of loam, while on the poorest granite soils quinine, hakea, grevillea, gardenia, *Eucalyptus setosa*, capoe (*Bombax Malabaricum*), and such like predominate, with some *E. grandifolia* interspersed. Guttapercha grows on the boulder metal hills, near Chillagoe. Pandanus, freshwater mangrove, and tea-tree are, as usual, throughout the north present in moist places irrespective of soil.

ETHERIDGE-CROYDON DISTRICT.

Physiographic.—The writer has only skimmed through this district, the geologic interest and mineral value of which justify the undivided attention of a geologist for a period of three years. It is therefore only possible to give a broad sketch and general impressions. Large areas of this district form a slightly undulating peneplain. This is the case with the granite areas. However, where metamorphic rocks predominate, rough hills and ranges are the characteristic type of scenery. That is the case on the Percy and at Gilberton.

The Newcastle Range porphyries also give rough scenery, and the later (supposed desert) sandstones yield flat-topped tablelands.

The granite and metamorphic country is badly watered. Water-boring in the granite generally yields salt water. Boring in the metamorphic country should always be carried out at or near intersections of reefs in the quadrant, which from the dip of country and reefs is best calculated to intercept the water.

Large portions of the Etheridge district are basalt-covered, especially between Fossilbrook and Einasleigh.

The basalts are very late Tertiary basalts which have flowed down river, valley, and watercourses, compelling considerable stretches of various rivers, *c.f.*, the Einasleigh and the Copperfield, to carve new valleys.

Climate.—The rainfall of the district ranges from 28 to 30 inches per annum, falling principally in January and February, and entirely in the wet season months.

Soils.—The soils are (except in the sandstone areas and limited stretches of granite slate country) of good quality. The "older granites" are of a calcic type, and yield fair soils.

Vegetation.—The forest flora of the Croydon-Etheridge granite country is more inclined to the calciphile than to the calciphobe type; this is on account of the lime felspar content of the granite and the comparatively slight leaching of soils under the climatic and topographic conditions of these granite areas.

Thus on the "older" granites of the Etheridge we get box (*E. bicolor* and *E. microtheca*), ironwood (*Erythrophloeum*), yellow-wood, ironbark (*E. pruinosa*), gum or Moreton Bay ash (*E. grandifolia*), mimosa (*Albizia basaltica*), corkwood, and bauhinia, while on the "new granites" (of Chillagoe granite age and acid character) we have quinine, hakea, gum (*E. grandifolia* chiefly), with box, tea-tree, and ironbark on the flats. On the desert sandstone of the Newcastle Range lancewood (*Acacia doratoxylon*) is one of the characteristic timbers on the poor deep sandy soils, and yellow bloodwood (yellowjacket, *E. trachyphloia*) on the red loams, but with these occur *Eucalyptus grandifolia*, *E. melanophloia*, *E. leptophleba*, *E. setosa*, *E. latifolia*?, *E. calycogona* var. *gracilis*, *E. dichromophloia*, *E. pallidifolia*?, *E. ferruginea*?, *E. tetradonta*, *E. terminalis*, *E. miniata*, *E. Normantonensis*, *Acacia latifolia*, *A. holoserica*, *A. falcata*, quinine, hakea, and grevillea species.

On the porphyries about May Lagoon (Croydon road) the following trees were abundant:—*E. terminalis*, *E. miniata*, *E. pruinosa*, *E. melanophloia*, hakea, &c. The Etheridge basalts were typically clothed with box (*Eucalyptus microtheca* and *E. pruinosa*), whitewood (*Astonia constricta*), orange (*Capparis Mitchelli*), yellow-wood (*Atalaya hemistawia*), and mimosa. In moist places on all formations *E. papuana*, *E. alba*, pandanus, tea-tree, pear, currajong (*Sterculia*), and freshwater mangrove, and by permanent waterholes the Leichhardt pine are strongly in evidence. As in the Territory, careyas, grevilleas, and such bushes are very plentifully distributed; and the Nondah (*Parmarium nondah*) occurs at the Little River on porphyries and rolling downs.

In vegetation, physiography, and climate this district is very similar to the Northern Territory. There is no scrub country at all in this region, and agriculture would only be possible with irrigation, in spite of the good soils, since the climate is markedly semi-arid.

The grasses are nutritious, and as long as bush fires are checked the area constitutes good cattle country, but the grass seeds are too bad for sheep.

[CONCLUDED.]

SUGAR : FIELD REPORTS.

The Northern Field Assistant, Mr. E. H. Osborn, reports under date 12th October, 1922, as follows:—

Herbert River District.

The harvesting in this area is proceeding at a great rate, and with the large weekly crushing, the season's operations will finish earlier than anticipated. No industrial troubles have caused delay, and, in this respect, everything points to a very satisfactory season. The total quantity of cane harvested will be under the earlier estimates, as a consequence of the very dry and cold weather experienced recently. Autumn plant cane is backward, and ratoons are also very light. Young plant cane also shows the effect of the dry weather. The varieties grown on the Herbert are principally Badila and H.Q. 426 (Clark's Seedling), with lesser quantities of H.Q. 409, Black Innis, Goru, Korpi, Nanemo, Oramboo, and varieties from the Sugar Experiment Stations, such as Q. 813, E.K. 1, E.K. 28, Q. 903, Q. 1121, Tableland Badila, and D. 1135.

The largest area of the lastnamed was a 7-acre block of June plant on Mr. J. Coomba's farm at Hawkin's Creek. It is the result of seed obtained from the Bundaberg Experiment Station last year, and certainly has made a fine strike, particularly at a time when the average strike of cane has been bad. It is growing upon some medium forest land, and Mr. Coomba intends trying it upon an area that is generally grub affected. Another of the newer varieties seen is Q. 813. Mr. Blackburn, of Macknade, has a paddock of this cane, planted last May, on a medium to poor soil. It looks remarkably green and healthy and has also struck splendidly. Mr. Blackburn is now cutting a 12-acre paddock of plant cane, consisting of Badila, H. Q. 409, and Q. 813. Of these three varieties, the lastnamed is easily the best for tonnage. Although the Q. 813 has arrowed slightly, the H.Q. 409 is a mass of arrows which developed much earlier than the former. Nearby, a small patch of Volunteered Q. 813 is cutting with good results, and the ratoons from it are already looking well, despite the dry weather. Out of a variety of canes planted in a paddock by Mr. W. J. Enticknap, consisting of Q. 813, E.K. 1, E.K. 2, E.K. 28, Q. 903, H. 109, and M.Q. 1 (Mowbray Seedling), the Q. 813 is easily the best. This particular paddock is only of average forest soil quality. Tractor power on the Herbert River is becoming more popular every year. Mr. E. J. Glover, of Hawkins Creek, has just completed a paddock, which he drilled, planted, and manured in one operation at the rate of 5 acres per day with a man each on the tractor and planter. This grower also planned to give a 32-acre block its first ploughing in four and a-half days with a 4-disc plough drawn by the same tractor.

Pests and Parasites.—The rat pest has been very severe upon the river this year. The Colonial Sugar Refining Company is going to a great deal of trouble supplying poison baits to farmers, but many farmers are lax in making the best of this opportunity. As, probably, these same growers are losing heavily from the pest, it is hard to understand their attitude in not seconding the company's efforts. Grubs have also done a certain amount of damage in places, and the collection of beetles in the worst affected places is to be renewed. Borers are very prevalent, and the Sugar Bureau's entomologist intends liberating tachinid flies in the most suitable area. In this matter, the Colonial Sugar Refining Company's officials are also doing very good work upon similar lines.

Gumming Disease.—This disease is causing a certain amount of anxiety to the local growers, as this year a large and scattered area is affected by it. The cane to which it is subject is mainly Clark's Seedling (H.Q. 426), although Badila is also affected to a slighter extent. As there is a very large proportion of this H.Q. 426 cane grown upon the Herbert, the seriousness of the situation is easily understood. In view of the foregoing, very many inquiries are being made for a cane less susceptible to the disease. The practice of planting whole sticks of cane in the drills and then chopping them through with a cane knife is condemned, for through these methods it is impossible to detect either gum-affected cane or that suffering from borer attack.

Goondi, Mourilyan, and South Johnstone.

The conditions in these areas was found to be somewhat better than those on the Herbert, as $1\frac{1}{2}$ inches of rain had fallen in August and a further 1.99 inches in September. The cold weather experienced further south had also made itself felt in these areas, and both the cane now being harvested and recently planted cane were affected. The tonnage to be harvested under such conditions will naturally be under the earlier estimates. The density figures are very good. A short visit was made to Cowley (Liverpool Creek) where some good cane was seen. Among the farms visited was that of Mr. J. McCutcheon, who has some 120 acres under cane. The soil is of a fairly stiff, clayey alluvial, and gives some very good yields per acre. Mr. McCutcheon ratoons deeply, uses the skeleton plough to burst up the middles, and later on follows with a heavy grubber going 12 or 14 inches deep. He also uses green manure, preferably beans. In the South Johnstone district proper, the area that looked most forward was in the neighbourhood of No. 2 branch. The ratoons cut recently looked very fair, as did also some May and June plant. A large area of this particular part of the district is now being put under the plough. The Japoon area seen was disappointing; the cane does not seem to have made much growth since early in the year; the young plant cane is also backward. A large acreage of this land has been grubbed ready for ploughing, and quite a large acreage has been planted. Rain is badly needed, both for the recently cut ratoons and the young plant.

Soldiers' Settlement.

This settlement has progressed rapidly since my last visit. Some seventy-seven settlers are delivering cane this year, of whom about forty are upon their blocks. The cane being cut is mostly standover Badila of a very good formation, and is probably the best class of cane going into the mill. The dry weather conditions have also been felt here, and the crops are backward. Horse tramlines connecting the farms with the derricks (three in number) have been laid down in central places, and harvesting is in full swing. A school has been opened in the township, and quite a number of very neat homes are to be seen upon the holdings. The block holders are a fine type of hard-working men and are determined to make good.

Banyan and Tully.

During a short visit paid to these areas, a large amount of good cane land was seen. The land ridden over was mostly a grey alluvial capable of growing heavy crops of cane. Owing to the uncertainty of being able to dispose of cane, only a few farmers have planted, but the samples seen of Badila were of a very good quality, while a few stools of M. 1900, upon Mr. Deane's farm, looked very good, too. Just now, much interest is being taken by the residents in the question of a mill for this rich district, as they recognise that, with a sugar factory in operation and a through line to Townsville, the potentialities of this splendid sugar-growing area must be recognised.

The Southern Field Assistant, Mr. J. C. Murray, reports under date 4th October, 1922, as follows:—

Beenleigh.

Renewed interest in sugar production is being taken in this district. Growers are increasing their acreages under cane, and taking a greater interest in varieties that are likely to give better c.e.s. results than those hitherto raised on Beenleigh areas. This is an important matter both for the sugar-mills and the farmers. The producers of sugar should gradually eliminate the old and more susceptible varieties to disease from their farms, and gradually work in such useful canes as E.K. 1, Q. 813, Q. 970, and Q. 1098. Such canes as D. 1135, Badila, M. 1900 Seedling, and Malagache, which are already fairly extensively planted, should be retained. The farmers here are advised to lime as much as possible on the heavier soils, also grow maize as a green manure and rotation crop for sugar-cane. They are also recommended not to cover their plants too heavily with earth, and regard early spring as the best time to plant. Farmers are also recommended to make full use of the facilities provided by the Bureau for getting soil analysed as a basis for fertilisation. A small number of progressive men with fertiliser testing plots on typical soils are always of great value to a cane district. The Beenleigh District Show was a great success this year, the cane exhibit being especially good. Much interest was also taken in the cane exhibits of the Bureau of Sugar Experiment Stations (non-competitive) and the Department of Agriculture and Stock's cotton and maize exhibits. The farmers are pleased with the interest taken by the above authorities, and would like it repeated next year.

Woongarra.

Very fair crops are being cut in the Woongarra district; in fact, much better than was originally expected after the prolonged dry spell following the Christmas rain. Most of the cane for next year's crop is in good condition, the young ratoons and plant cane making a good showing. Varieties looking well are M. 1900, Q. 813, H.Q. 285, Badila, and Shahjahanpur No. 10. Good cultivation is in evidence on most farms, although some growers, through lack of facilities, are not ploughing deeply enough. The Hummock Plantation, probably, takes the lead in thorough cultivation on a large scale, the results obtained being largely due to this practice. Taking all the lessons of the past into consideration, it is likely that, if the growers of cane could get down deeply into the soil (not necessarily invert it), the danger of dry weather would be greatly minimised. The greater use of disc harrows is recommended. There is a good deal of dissatisfaction regarding the price of motor tractors. Owing to matters over which the farmer has no control, the price for them is excessive compared with what the primary producers have to pay in countries from whence they come. More than the average amount of horse power is necessary for many of the sugar-growers to properly work their fields nowadays, hence the difficulty the small man has in keeping pace with his more financial brother.

Barolin.

This portion of the Bundaberg district is cutting out well. The cane is ratooning satisfactorily, and the plant crop (early Spring) presents a good strike. Provided an ordinary immunity from frost, and an average rainfall is experienced, the crop next year should be a good one. Cane varieties giving very satisfactory returns are Shahjahanpur No. 10, Q. 813, D. 1135, and M. 1900 Seedling. Several growers are particularly pleased with the results obtained from Shahjahanpur. This variety is cutting with a high c.e.s. and has shown a marked resistance to frost, and gives fair tonnages per acre. Land is being cleared and planted with this cane at S. Kalkie at the present time. On this Barolin land, good results are obtained by the use of bonedust, from 3 to 5 cwt. per acre. The growers here are recommended to practice as much local experiment, relative to guiding them in the use of chemical fertilisers, as possible; also to submit soils for analyses to the Bureau. Farmers are also requested to tabulate the results of any experiments they may make and keep records of the behaviour of cane varieties. This is always valuable information to the agricultural community.

Gooburrum.

Probably, some of the best crops in the Bundaberg district this season are coming from the Gooburrum area, particularly the D. 1135 and the M. 1900 Seedling. Next year's prospects, so far, are also good. The cane is ratooning vigorously, while the young plant cane looks very healthy. Very little is left to be desired in regard to cultivation. Considerable quantities of filter press cake have been used on this land in the past, accounting in a large measure for the improved texture of soil. Other cane varieties, besides those mentioned above, making a good showing are E.K. 1, E.K. 2, E.K. 28, J. 247, H.Q. 285, and Q. 1098. Regarding manurial results, growers have found the turning in of Mauritius bean beneficial, also the use of a fertiliser known as Mt. Etna. Average c.e.s. returns from the staple variety (D. 1135) have been about 13 per cent. No marked evidence of deterioration by disease is traceable in the cane at present.

Sharon.

Farmers are taking off satisfactory crops in this area, while the young plant crop and ratoons look well. No setbacks are being experienced so far by grubs or borer attack, nor is there marked evidence of bacteria agencies or root destroying fungi. Varieties making a good showing are Q. 813, Malagache, D. 1135, N.G. 16, Shahjahanpur No. 10, Q. 77, Badila, B. 208, M. 1900 Seedling, N.G. 24, A. and H.Q. 285. N.G. 15 has given the best c.e.s. results, so far, with averages of 15.5 per cent. Growers in this area are recommended to use lime as much as possible, on the more tenacious soils, with a view to improved texture.

Oakwood.

The growers here are carrying on with good results. The whole plantation presents a well-farmed appearance, and the farmers are taking off satisfactory crops. The cane here, also, is ratooning well, and the plant crop is making headway. Varieties outstanding at present are the D. 1135, M. 1900 Seedling, and Q. 813. Some of the growers are introducing Malagache which, judging by stools already growing, should do fairly well. Farmers are recommended to green manure as much as possible, and keep the soil in a sweet condition by occasional applications of lime. As there are a number of very progressive farmers both here and in the Gooburrum district, they are requested to tabulate any information they may have on fertilising and cane varieties, with a view to this being of benefit to the community.

Bucca.

This area presents a more extensively cultivated appearance than it has done for some years. The farmers are taking off their crops, although the dry weather after the midsummer rains gave the cane a serious setback. However, if most of the farmers get a good season next year, they will be on their feet. Cutting, ratooning, and farming operations generally were in full swing at the time of visiting, and fresh land was being planted, or, at least, land that had been out of cane for a number of years. Cane varieties at present doing well include Shahjahanpur No. 10, Q. 813, E.K. 1, Q. 1098, and D. 1135. All the first four mentioned should do well, and the farmers are recommended to give them a fair trial. Farmers at present are not greatly affected by destructive parasites or fungoid agencies. The use of lime over a large area would be beneficial at present.

Avondale (Moorlands).

On these river soils the cane is making a very fair showing, particularly the D. 1135, H.Q. 285, and M. 1900 Seedling. The H.Q. 285 is a cane that is being widely distributed at present on account of its early maturing properties, and is a good variety to plant with M. 1900 Seedling on that account. Mr. Scotney, senr., of Moorlands, has sent a considerable tonnage of this cane to various cane areas for planting. Other canes that the growers are recommended to try here are Shahjahanpur No. 10, E.K. 1, and Q. 970.

Bingera.

Crushing is now in full swing here. The cane coming to the mill is healthy and of good length. One stick of M. 1900 Seedling grown on the plantation was 8 feet 3 inches long and weighed 15 lb. Another variety, B. 156, yielded 63½ tons to the acre, with a c.e.s. value of 12.06. The best fertilising results are being obtained at present from the use of basic superphosphate and "Three sevens." As a green manure, cowpea is extensively used. Cane varieties doing well on the farms are Q. 813, E.K.1, M. 1900, and D. 1135. Rain is now wanted on the Bingera areas. However, the young plant crop looks well, and the ratoons are coming away vigorously. No sign of serious disease is in evidence, nor any marked grub infestation.

Gin Gin.

Although the long spell of dry weather militated seriously against the chance of cutting a big crop, the returns from the Gin Gin areas this year are going to be very fair. The farming is all of a high standard, and the growers are keen on raising the best cane available. Since the subdivision of the Watawa plantation, several new farmers have started on these lands and are doing well. Rain is wanted at present, but, nevertheless, the young crop is healthy and growing well. Cutting was in full swing at the time of visiting this area, consequently each farmer was working at full pressure to get his crop cut. A cane variety making a good showing on both the red soils and the Maroondan black soils is M. 1900 Seedling, a cane coming more and more into favour. The farmers are also contemplating an increased area of H.Q. 285, as recommended in previous reports. Growers are advised to discourage the burning of cane as much as possible and to plant maize and cowpea as rotation and green manure crops. Lime is essential on the black soils at Maroondan.

In all the districts under review, labour trouble is at a minimum, harvesting going with a swing. There is an excellent class of field worker in the south this season.

FRUIT FLY INVESTIGATIONS.

The Minister for Agriculture and Stock (Hon. W. N. Gillies), has made available the following report for the month of September from the Entomologist (Mr. Hubert Jarvis), stationed at Stanthorpe.

WINTERING OF FRUIT FLY.

Some time has been spent continuing the effort to discover, if practicable, any indication of the fruit fly (*B. tryoni*), wintering in the soil in the pupal form. Thus, at the Summit, search was made in and under a packing shed where a large quantity of late apples had been stored. No living fruit fly pupæ were, however, met with here.

In the Ballandean district, also, a dump was visited where 2,000 cases of fruit fly infested apples had been deposited; careful sieving of the soil under and around this dump failed to bring to light any fruit fly pupæ—empty or unhatched. When the number of maggots which must have been present in so large a quantity of infested fruit is taken into account, the total absence of fruit fly puparia in such a situation—200 feet below Stanthorpe—seems to further indicate the non-wintering in the soil of the fruit fly (*B. tryoni*), in the Granite Belt.

Again, in the Ballandean district, a dump was examined where fly-infested fruit had been buried 18 inches to 2 feet deep in the orchard. This fruit (principally late peaches) on being dug up was found to be in a more or less rotting condition, although individual fruits were still in part quite firm. A careful search in this fruit and in the surrounding soil failed to reveal any fruit fly maggots or pupæ, in spite of the fact that large numbers of fruit fly maggots must have been originally present, as was evidenced by the numerous tracks and borings still visible in the fruit and fruit pulp. Probably the fermentation of the fruit was a factor contributing to the destruction of the maggots.

FRUIT FLY IN PACKING SHEDS.

On examination of the two fruit fly pupæ found in Mr. D. Pfunder's shed, both were found to be dead; in one case dried up internally, and in the other full of decomposing liquid. I might mention here that the finding of these two pupæ in no way implies any carelessness on Mr. Pfunder's part, nor reflects in any way on his admirably cultivated and well cared for orchard. Fruit fly pupæ (empty cases) can be found in and under almost any shed in the Granite Belt where fly-infested fruit has been stored. Rather was it my intention to assemble evidence to prove that the fruit fly does not winter in the pupal form in this district, but is a seasonal visitor from lower altitudes.

THE ADULT FRUIT FLY.

A watch, such as is possible, is being kept on all native and cultivated trees and shrubs for any sign of the adult or mature fruit fly.

Fruit flies, in common with most Diptera (two winged flies), must, to sustain life, have access to some more or less liquid nectar; this want is, in nature, abundantly supplied by numerous flowers; the nectar they contain being more plentiful in the morning before the sun has had time to dry the dew from the blossoms.

Although daily increasing numbers of Diptera are now on the wing, and can be observed visiting the numerous flowering trees and plants, no fruit flies have, so far, been noted. Should this insect hibernate as a fly, it is only reasonable to conclude that the warm, genial weather now being experienced in this district would tempt at least some specimens to break their long winter fast.

Fly lures placed in various parts of the district have also failed, so far, to attract a single specimen of the Queensland fruit fly (*B. tryoni*).

An early visit to Warwick and Toowoomba districts is contemplated, with a view to determining, if possible, the nearest point to the Granite Belt at which the fruit fly is to be found:—(1) *Wintering in the soil in the pupal form*; presuming that this is its native habit (as is stated by Mr. W. W. Froggatt, Government Entomologist, New South Wales); or (2) *Overwintering as an adult fly*, a possibility favoured by the Entomologist in Chief, Mr. H. Tryon. Definite information on this point would prove of much interest and value. Possibly we shall have to go below the Darling Downs before finding our objective.

RED MITE (*BRYOBIA* Sp.).

This mite (in evidence in the egg form on the trees in many orchards) is now hatching out. Oil sprays used during the winter on these eggs, although killing a good number, have not proved a complete control; on the living mites, however, oil sprays (red oil; 30 water) should prove quite satisfactory. The lime-sulphur and arsenate sprays now soon to be used by orchardists for woolly aphis and Codlin moth, respectively, should also be beneficial in helping to control *Bryobia* mite.

VINE INJURIOUS INSECTS.

An instance of a species of *Cicada* ovipositing in grape vine wood was brought to my notice by Mr. A. E. Sewell, of Applethorpe. This is probably one of our small *Cicadas* (*Melampsalta* sp.), and it is to my knowledge the first instance of a *Cicada* ovipositing in the vine.

By the same source, another vine insect also was received (a borer), the larval or caterpillar form of a *Xylaryetid* moth.

I do not think that either of these insects is likely to prove a pest of economic importance; but growers cannot do better than to emulate the good example of Mr. Sewell, thus keeping a sharp lookout among the vines for any sign of sickness or of insect damage.

Visits of inspection have been made to the following districts:—The Summit, Applethorpe, Diamond Vale, Ballandean, and Eukey.

SPRAYING EXPERIMENTS.

Some time has been devoted to the testing of the possible efficacy of various sprays for peach aphis (*Myzoscera*), but no satisfactory results have been so far obtained.

The control of the woolly aphis occurring on the roots of apple trees will, it is proposed, shortly be attempted; a machine for injecting liquids into the soil having been kindly loaned to the office by Mr. W. F. Barnard, of Applethorpe.

HOME TANNING—I.*

Numerous requests have reached the Department of Agriculture and Stock for directions for tanning hides on a small scale. Usually the tanning of a few hides or skins by inexperienced persons or those lacking adequate facilities cannot be recommended from the view point either of national economy or of individual profit. Sometimes, however, circumstances arise when a knowledge of tanning is of particular value on the farm. From time to time various methods of tanning have been described in the Journal. The latest information, containing possibly some new ideas, we have embodied in D.C. 230 of the U.S. Department of Agriculture on "Home Tanning," issued in July of this year, and from which the following notes are abstracted. A second instalment will be published in the next issue.—Ed.

Although good serviceable leather has been made in the Bureau of Chemistry, with the equipment and directions here described, the inexperienced operator will probably often be unsuccessful. Every attempt, however, through close observation and experimenting, should add to his experience and reduce the number of his failures. Operating on a small scale, he can not hope to obtain leather equal in appearance and possibly quality to that on the market, but he should be able to obtain leather of service for many purposes on the farm. It will also probably be found necessary at times to modify these directions, especially as to equipment, to suit conditions or in tanning other kinds of leather. Success in this will depend largely upon the experience and ingenuity of the individual.

General Information.

Complete directions are given in this circular under each method of tanning described. This results in repeating the description of some operations which are common to nearly all methods of tanning, but the repetition is necessary to avoid the confusion that otherwise would result from disconnected directions. The details essential in explaining the numerous steps should not prove confusing. The directions need not, of course, be memorised, but they should be carefully studied until they are thoroughly understood before the operation is begun. All supplies and equipment should be obtained and plans should be fully made before beginning the work.

Unless otherwise specified, tanning operations are best done at a uniformly moderate temperature. For convenience there should be a handy supply of fresh water and also a drain. All the operations can be done in tight, clean wooden barrels, of 40 to 60 gallons capacity. When not in use the barrels should be kept clean and full of water. Half barrels and wooden buckets and tubs are very convenient for many purposes. Iron containers should never be used.

Hides and Skins.

The hide or skin may be started in process as soon as it has been taken-off, drained, and cooled from the animal heat. Overnight will be long enough. If you are not ready to begin tanning, or if you have at one time more hides than you can handle, they can be kept safely for three to five months in a thoroughly salted condition. During storage or tanning the hides must never be allowed to freeze or heat. Some tanners claim that salting before tanning is helpful, and it will certainly not do any harm to salt the hide for a few days before tanning.

The kind of leather which can be made from a hide or skin depends largely upon its weight and size. The tanning trade makes distinctions in hides and skins based mainly upon the size and age of the animal and upon the class of leather. Hides from the larger and adult animals are suitable for sole, harness, belting or heavy leathers. Skins from the smaller animals, such as sheep, goats, calves, and deer, are made into light and fancy leathers. While there are other commercially important sources of hides and skins, the most important ones, with the exception of furs, are the usual domesticated farm and range animals. As a general rule, the thickness of the finished leather will be about that of the untanned hide, and this should be a guide in selecting skins for different kinds of leather.

The first essential for a satisfactory yield of good leather is a good, sound, clean hide or skin. Skinning should be done properly, without cutting or scoring the hide, at the same time leaving on it no fat and meat, which must be removed later before tanning and which, if left on, increases the chances of spoiling or rotting the hide.

Bark-tanned Sole and Harness Leather.

Read the directions through before starting this work.

These directions have been prepared for tanning a single heavy cow, steer, or bull hide, weighing from 40 to 70 lb., into bark-tanned leather suitable for sole, harness, or belting.

* Department Circular 230, by R. W. Frey, I. D. Clarke, and F. P. Veitch, Bureau of Chemistry, United States Department of Agriculture (July 1922).

Slaking Lime.

Put 6 to 8 lb. of burnt or caustic lime in a clean half barrel, wooden tub, or bucket, of at least 5 gallons capacity. Use only good-quality lime, free from dirt and stones and never air-slaked. To the lime add about 1 quart of water. As the slaking begins, add more water, a little at a time, to keep the lime moist; do not pour in water enough to quench the slaking. After the lime appears to be slaked, stir in 2 gallons of clean water. Do all this just exactly as you would make white-wash. Slake the lime on the day before you start soaking the hide, and keep the limewater covered with boards or sacks until ready for use.

If available, fresh hydrated lime, not air-slaked, may be used instead of slaking burnt or caustic lime. In this case use 8 to 10 lb. in 4 or 5 gallons of water.

Soaking and Cleaning.

If the hide has been salted, shake it vigorously to remove most of the salt. Spread it out, hair side down, and trim off the tail, head, ears, all ragged edges, and shanks.

Place the hide, hair side up, lengthwise, over a smooth log or board, and, with a sharp knife, split from neck to tail, straight down the backbone line, into two half hides, or "sides." It will be more convenient in subsequent handling, especially when the hide is large, to then split each side lengthwise through the "break," just above the flanks, into two strips, making the strip with the backbone edge about twice as wide as the belly strip. Thus a whole hide will give two sides or four strips. In these directions the "side" should be taken to mean either side or strip, as the case may be.

Fill a 50-gallon barrel with clean, cool water. Hang the sides, flesh out, over short sticks and suspend them in the barrel of water to soak for two or three hours. Stir them about frequently to soften, loosen, and wash out the blood, dirt, manure, and salt. (The short sticks or pieces of rope may be held in the proper position by tying a loop or cord on each end and catching the loops over nails in the outside of the barrel near the top.) After soaking for about three hours, take out the sides, one at a time, and place them, hair side up, over a "beam." (A ready-made beam can be purchased, but a fairly satisfactory one can be made from a very smooth slab, log, or thick planed board from 1 to 2 ft. wide and 6 to 8 ft. long. The slab or log is inclined, with one end resting on the ground and the other extending over a box or trestle so as to be about waist high.) With the side lying hair side up over the beam, scrub off all dirt and manure, using, if necessary, a good stiff brush; then wash off with several bucketfuls of clean water.

Now turn the side over, flesh side up, and scrape or cut off any meat or flesh. Work over the entire flesh side with the back edge of a drawing or butcher knife, held firmly by both ends while pushing away from you hard against the hide or skin. Wash off with a bucket or two of clean water. This working over should always be done. Refill the soak barrel with clean, cool water and hang the sides in it as before, working them about frequently until they are soft and flexible. A green or fresh hide usually needs to be soaked for not more than twelve or fourteen hours; a green salted hide for not more than twenty-four to forty-eight hours.

When the sides are properly softened throw them over the beam and thoroughly scrape off all remaining flesh, fat, or meat. It is of the greatest importance to remove all this meat. When it cannot be scraped off, cut it off, but be careful not to cut into the hide itself. Even should there appear to be no flesh to take off and nothing appears to be removed, it is necessary to thoroughly work over the flesh side in this way with the back of a knife. Finally, wash off with a bucketful of clean water.

The hide must be soft, pliable, and clean all over before being put into the lime.

Liming to Remove the Hair.

Wash out the soak barrel and pour into it all of the slaked lime. Nearly fill the barrel with clean, cool water, and stir thoroughly. Hang the sides or strips again over the short sticks or pieces of rope, hair side out, and suspend them in the barrel so that they are completely covered by the lime water. See that the sides are suspended with as few folds or wrinkles as possible and also be sure not to trap any air under the sides. Keep the barrel covered. Plunge the hides and stir the lime-water three or four times each day until the hair will come off easily. This will take from six to ten days in summer, and possibly as many as sixteen days in winter. When thoroughly limed the hair can be rubbed off readily with the hand. Early in the liming process it will be possible to pull out the hair, but the hide must be left

in the lime until the hair comes off by rubbing over with the hand. For harness and belting leathers leave the hide in the limes for three to five days after this condition has been reached.

When limed, throw the side, hair side up, over the beam, and, with the back edge of a drawing or butcher knife, held nearly flat against the hide, push off the hair from all parts of the hide. If the side is sufficiently limed, a curdy or cheesy layer of skin rubs off with the hair. If this layer does not rub off, the side must be returned to the limewater. After removing the hair, put the side back again for another day, until any fine hairs that may remain can be easily scraped off. Now thoroughly work over the grain or hair side with a dull-edged tool to "scud" or work out as much lime, fat, and dirt as possible. Then turn the side over and do the same thing, being sure to remove all fleshy matter. Shave down to the hide itself by craping or by using a very sharp knife with a motion somewhat like that of shaving your face. Rinse off both sides of the hide with clean water. Wash the hide in cool, clean water for six to eight hours, changing the water frequently, and then proceed as under "Deliming."

The lime, limewater, sludge, and fleshings from the liming process may be used as fertiliser, being particularly good for acid soils. The hair, as it is scraped from the hide, may be collected separately, and, after being rinsed several times, may be used in plastering. If desired, it can be thoroughly washed with many changes of water until absolutely clean and, after drying out in a warm place, can be used for padding, upholstering, insulation of pipes, &c.

Deliming.

Buy 3 oz. of U.S.P. lactic acid (or 9 oz. of tannery 22 per cent. lactic acid). Nearly fill a barrel with clean, cool water and stir in the lactic acid. Now hang in the un haired sides or strips. Pull them up, and stir frequently for about twenty-four hours. Take out the sides, work over, "scud" them thoroughly as directed under "Liming," and hang them in a barrel of cool water. Change the water several times, and finally leave them in the water overnight.

If lactic acid cannot be obtained, use one-half gallon of vinegar instead.

Tanning.

The hide or sides are now ready for the actual tanning. From fifteen to twenty days before this stage is reached weigh out 30 to 40 lb. of good-quality, finely-ground oak or hemlock bark and pour on to it about 20 gallons of boiling water. (Finely-ground bark, with no particles larger than a grain of corn, will give the best results. Simply chopping the bark into coarse pieces will not do. Do not let the tan liquor come in contact with iron vessels. Use the purest water available. Rain water is best.) Let this bark infusion stand in a covered vessel until ready to use. Stir it up occasionally. When ready to start tanning, strain off the bark liquor through a clean, very coarse sack into the tanning barrel. Fill the barrel about three-fourths full with water, rinsing the bark with this water so as to get out as much tannin as possible. Add two quarts of vinegar. Stir well. Hang the sides or strips, from the deliming, over sticks, and suspend them in this tanning liquor with as few folds and wrinkles as possible. Move the sides about and change their position often so as to get an even colour. Just as soon as this has been started, weigh out the same quantity of ground bark and soak it with hot water as before. Let this second bark liquor stand until the sides have become evenly coloured, or for from ten to fifteen days. Then add one-fourth of the second bark liquor, taking out from the tanning barrel first the same amount of old liquor as you are going to add of the new or second bark liquor. Also add about 2 quarts more of vinegar and stir it in well. After five days add another fourth of the tan liquor only (no vinegar); do this every five days until the liquor is used up.

About thirty-five days after the actual tanning has been started, the sides are ready for the first bark. (The progress of the tanning varies somewhat with conditions and can best be told by inspecting a small sliver cut from the edge of the hide. The fresh cut should show two somewhat dark or brown streaks coming in from each surface of the hide. These streaks will be rather narrow, about as wide as a heavy pencil line.) Weigh out about 40 lb. of fine bark and just moisten it with hot water. Do not add more water than the bark will soak up. Pull the sides out of the tan liquor and dump in the moistened bark, keeping as much of the old tan liquor in the barrel as possible. Mix thoroughly, and while mixing hang the sides back in the barrel. Actually bury them in the bark; all parts of the sides must be kept well down in the bark mixture. Leave the sides in this bark for about six weeks, moving them about once in a while.

After six weeks pull the sides out (a cutting should show that the tanning has spread nearer to the centre); pour out about half the liquor. Stir the bark in the

barrel, hang the sides back, and fill the barrel with fresh finely-ground bark. Leave the sides in for about two months, shaking the barrel from time to time, and adding bark and water as needed to keep the sides completely covered.

At the end of this time the hide should be evenly coloured all the way through, without any white or raw streak in the centre of a cut edge. If it is not struck through it must be left longer in the wet bark and more bark may be necessary. For harness, strap, and belting leather the sides may be taken out of the tan liquor at this stage, but for sole leather they must be left for two months longer. When fully tanned through the sides are ready for finishing.

Finishing.

Harness and Belting Leather.—Take the sides from the tan liquor, rinse them off with water, and scour the grain side with plenty of warm water and a stiff brush. This must be very thoroughly done until most of the tan liquor and water has been rubbed or pressed out. Then go over the sides with a “slicker,” working them out on the grain side in all directions. (A slicker can be made from a piece of copper or brass, about one-fourth inch thick, 6 inches long, and 4 inches wide. One long edge of the slicker is mounted in a wooden handle, and the other long edge, well rounded, is used to work over the sides by pushing hard against them and away from yourself.) For harness, belting, and the like this scouring and slicking out must be thoroughly done. When the sides are still damp, but not very wet, go over the grain side with a liberal coating of neat’s-foot or cod oil. Hang up the sides and let them dry out slowly. When dry, take them down and dampen them well by dipping in water or rolling up in wet sacking or burlap. When uniformly damp and limber, evenly brush or mop over the grain side with a thick coating of a dubbin made by melting together about equal parts of cod oil and tallow or neat’s-foot oil and tallow. When cool, this dubbin must be soft and pasty, but not liquid, and it must be melted before using and applied warm. Hang up the sides again and leave until thoroughly dried. When dry, remove the tallow from the grain by working over with the slicker. If more grease in the leather is desired, dampen back and apply another coating of the dubbin, giving a light application also to the flesh side. When again dry remove the tallow. Rubbing over with sawdust will help to take up any surface oiliness.

If it is desired to blacken the leather, this must be done before greasing. A black dye solution can be made by dissolving one-half ounce of water-soluble nigrosine in $1\frac{1}{4}$ pints of water, with the addition, if handy, of several drops of ammonia. Evenly mop or brush this solution over the dampened but ungreased leather, and then grease as directed in the preceding paragraph.

Sole Leather.—Take the sides from the tan liquor and rinse them off thoroughly with clean water. Press out most of the water, and hang them up until they are only damp; then apply a good coating of neat’s-foot or cod oil to the grain side. Again hang up until thoroughly dry.

When repairing shoes with this leather it is advisable, after cutting out the piece for soling, to dampen and hammer it down well, and then, after putting it on the shoe, to make it waterproof and more serviceable by setting the shoe for about fifteen minutes in a shallow pan of melted grease or oil. The grease or oil must not be hotter than the hand can bear. Any good oil or grease will do, and the following simple formulas have been found to be satisfactory:—

Formula 1:—								Ounces.
Neutral wool grease	..	..	..	..	..	..	..	8
Dark petrolatum	..	..	..	..	..	..	..	4
Paraffin wax	..	..	..	..	..	..	..	4
Formula 2:—								
Petrolatum	..	..	..	..	..	..	..	16
Beeswax	..	..	..	..	..	..	..	2
Formula 3:—								
Petrolatum	..	..	..	..	..	..	..	8
Paraffin wax	..	..	..	..	..	..	..	4
Wool grease	..	..	..	..	..	..	..	4
Crude turpentine gum (gum thus)	..	..	..	..	..	..	..	2
Formula 4:—								
Tallow	..	..	..	..	..	..	..	12
Cod oil	..	..	..	..	..	..	..	4

(In the next issue the chrome process of tanning will be described.)

REPORT ON EGG-LAYING COMPETITION, QUEENSLAND AGRICULTURAL COLLEGE, SEPTEMBER, 1922.

The results for the month of September were, on the whole, fairly satisfactory. In the light section, Mr. C. H. Singer's White Leghorns topped the score with 168 eggs, closely followed by Mr. N. A. Singer with 167; the latter's D. bird has put up a fine unfinished run of 40 eggs. This bird is a fine layer and a good worker. In the heavy breeds Mr. R. Burns leads for the month with 157 eggs, the second place being taken by Mr. W. Becker's Langshans. Two deaths occurred in the course of September. Some trouble was experienced with broodies in the course of the month. Following are the individual records:—

Competitors.	Breed.	Sept.	Total.
LIGHT BREEDS.			
*N. A. Singer	White Leghorns ...	167	747
C. H. Singer	Do.	168	716
W. and G. W. Hindes	Do.	139	685
*Bathurst Poultry Farm	Do.	135	623
*T. Fanning	Do.	139	594
*W. A. Wilson	Do.	126	585
J. H. Jones	Do.	130	583
*G. Trapp	Do.	129	582
*Mrs. L. Andersen	Do.	136	581
*S. L. Grenier	Do.	134	577
*R. Gill	Do.	146	574
*J. M. Manson	Do.	149	572
A. G. C. Wenck	Do.	129	569
*W. Becker	Do.	137	564
*H. P. Clarke	Do.	133	555
*G. Williams	Do.	125	540
*J. W. Newton	Do.	138	540
*R. C. Cole	Do.	137	532
*O. Goos	Do.	116	531
*C. Goos	Do.	138	521
B. Hawkins	Do.	104	521
*Oakleigh Poultry Farm	Do.	142	511
*H. Fraser	Do.	125	510
J. Purnell	Do.	100	510
*Mrs. R. Hodge	Do.	145	509
A. Maslin	Do.	104	506
*J. W. Short	Do.	131	487
*Mrs. E. White	Do.	113	482
*Thos. Taylor	Do.	128	477
T. H. Craig	Do.	119	476
*C. M. Pickering	Do.	133	473
*R. C. J. Turner	Do.	133	472
*M. F. Newberry	Do.	121	472
N. J. Nairn	Do.	129	467
E. Stephenson	Do.	119	450
G. F. Richardson	Do.	105	448
*F. Birchall	Do.	115	448
*E. A. Smith	Do.	124	445
E. Symons	Do.	120	437
B. C. Bartlem	Do.	114	434
A. Anders	Do.	111	393
Brampton Poultry Farm	Do.	104	375
H. Trappett	Do.	128	369
Parisian Poultry Farm	Brown Leghorns ...	110	220

EGG-LAYING COMPETITION—*continued.*

Competitors.	Breed.	August.	Total.
HEAVY BREEDS.			
*R. Burns	Black Orpingtons ...	157	650
*A. E. Walters	Do.	133	646
*T. Hindley	Do.	131	604
*H. M. Chaille	Do.	123	596
*R. Holmes	Do.	112	593
Mrs. A. Kent	Do.	110	563
Jas. Hutton	Do.	101	556
Wambo Poultry Farm	Do.	121	550
*C. C. Dennis	Do.	141	545
*E. F. Dennis	Do.	118	515
Mrs. A. E. Gallagher	Do.	124	509
*Jas. Potter	Do.	110	495
R. Innes	Do.	122	489
*Rev. A. McAllister	Do.	93	470
Mrs. L. Maund	Do.	113	469
V. J. Rye	Do.	105	452
W. Becker	Chinese Langshans ...	145	447
H. B. Stephens	Black Orpingtons ...	129	442
*Parisian Poultry Farm	Do.	132	434
Jas. Hitchcock	Do.	102	430
C. Doan	Do.	91	427
C. Rosenthal	Do.	103	388
W. C. Trapp	Do.	90	357
R. Burns	Silver-laced Wyandottes	116	335
*J. E. Smith	Plymouth Rocks ...	107	300
*Miss L. Hart	Rhode Island Reds ...	102	177
Total ... ..	...	8,659	35,102

* Indicates that the pen is being single tested.

DETAILS OF SINGLE HEN PENS.

Competitors.	A.	B.	C.	D.	E.	F.	Total.
LIGHT BREEDS.							
N. A. Singer	111	142	114	128	125	127	747
W. and G. W. Hindes	127	106	118	110	119	105	685
Bathurst Poultry Farm	86	86	110	115	125	101	623
T. Fanning	71	123	111	109	126	54	594
W. A. Wilson	95	89	79	112	100	110	585
Geo. Trapp	107	87	91	105	94	98	582
Mrs. L. Andersen	118	74	103	96	93	97	581
S. L. Grenier	94	65	104	102	105	107	577
R. Gill	106	103	112	90	75	88	574
J. M. Manson	97	83	105	81	108	98	572
W. Becker	92	64	106	93	99	110	564
H. P. Clarke	96	77	96	106	90	90	555
G. Williams	84	93	104	90	89	80	540
J. W. Newton	113	89	104	72	97	65	540
R. C. Cole	102	95	99	61	89	86	532
O. Goos	89	71	99	110	94	68	531
C. Goos	67	75	73	98	114	94	521
Oakleigh Poultry Farm	98	76	91	75	74	97	511
H. Fraser	88	98	87	76	71	90	510
Mrs. R. Hodge	110	57	83	83	102	74	509
J. W. Short	85	83	94	69	65	91	487

EGG-LAYING COMPETITION—*continued.*
DETAILS OF SINGLE HEN PENS—*continued.*

Competitors.	A.	B.	C.	D.	E.	F.	Total.
LIGHT BREEDS— <i>continued</i>							
Mrs. E. White	99	23	95	60	107	98	482
Thos. Taylor	100	68	85	80	79	65	477
C. M. Pickering	100	95	59	75	84	60	473
M. F. Newberry	85	57	53	110	69	98	472
R. C. J. Turner	85	70	92	87	84	54	472
F. Birchall	80	86	52	41	99	90	448
E. A. Smith	90	64	91	83	55	62	445
HEAVY BREEDS.							
R. Burns	101	112	95	118	113	111	650
A. E. Walters	106	104	88	104	124	120	646
T. Hindley	82	103	66	138	137	78	604
H. M. Chaille	113	95	111	100	105	72	596
R. Holmes	74	124	99	98	94	104	593
C. C. Dennis	90	103	94	79	97	82	545
E. F. Dennis	90	82	107	31	96	109	515
J. Potter	77	87	96	79	98	58	495
Rev. A. McAllister	87	101	104	54	25	99	470
Parisian Poultry Farm	53	73	85	54	83	86	434
J. E. Smith	34	62	48	40	53	63	300
Miss L. Hart	34	39	27	36	10	31	177

CUTHBERT POTTS, Principal.

WEIGHT OF EGGS, SINGLE HEN PENS.

	A.	B.	C.	D.	E.	F.	Average
	Oz.	Oz.	Oz.	Oz.	Oz.	Oz.	Oz.
LIGHT BREEDS.							
R. Gill	2 $\frac{1}{8}$	2 $\frac{1}{8}$	2 $\frac{1}{8}$	2 $\frac{1}{8}$	2 $\frac{1}{8}$	2 $\frac{1}{8}$	2 $\frac{1}{8}$
W. and G. W. Hindes	2 $\frac{1}{8}$	2 $\frac{1}{8}$	2 $\frac{1}{8}$	2 $\frac{1}{8}$	2 $\frac{1}{8}$	2 $\frac{1}{8}$	2 $\frac{1}{8}$
J. M. Manson	2 $\frac{1}{8}$	2 $\frac{1}{8}$	2 $\frac{1}{8}$	2 $\frac{1}{8}$	2 $\frac{1}{4}$	2 $\frac{1}{4}$	2 $\frac{1}{4}$
M. F. Newberry	2 $\frac{1}{4}$	2 $\frac{1}{4}$	2 $\frac{1}{8}$	2 $\frac{1}{8}$	2 $\frac{1}{8}$	2	2 $\frac{1}{8}$
F. Birchall	2	2	2 $\frac{1}{4}$	2 $\frac{1}{8}$	2 $\frac{1}{8}$	2 $\frac{1}{8}$	2 $\frac{1}{8}$
T. Fanning	2 $\frac{1}{8}$	2 $\frac{1}{8}$	2 $\frac{1}{8}$	2 $\frac{1}{8}$	2 $\frac{1}{4}$	2 $\frac{1}{8}$	2 $\frac{1}{8}$
Mrs. E. White	2	2	2 $\frac{1}{8}$	2 $\frac{1}{8}$	2 $\frac{1}{8}$	2 $\frac{1}{8}$	2 $\frac{1}{8}$
H. Fraser	2 $\frac{1}{8}$	2 $\frac{1}{4}$	2	2 $\frac{1}{8}$	2 $\frac{1}{8}$	2 $\frac{1}{8}$	2 $\frac{1}{8}$
Oakleigh Poultry Farm	2 $\frac{1}{8}$	2 $\frac{1}{8}$	2	2 $\frac{1}{8}$	2 $\frac{1}{8}$	2	2 $\frac{1}{8}$
E. A. Smith	2 $\frac{1}{8}$	2	2 $\frac{1}{4}$	2	2 $\frac{1}{8}$	2	2 $\frac{1}{8}$
W. Becker	2 $\frac{1}{8}$	2	2	2	2 $\frac{1}{8}$	2 $\frac{1}{8}$	2
R. C. Cole	1 $\frac{7}{8}$	1 $\frac{1}{8}$	2	2	2 $\frac{1}{8}$	2	2
Mrs. R. Hodge	2 $\frac{1}{4}$	2 $\frac{1}{4}$	2 $\frac{1}{8}$	2 $\frac{1}{8}$	2 $\frac{1}{4}$	2 $\frac{1}{4}$	2 $\frac{1}{4}$
R. C. J. Turner	2	2	2 $\frac{1}{8}$	2	2 $\frac{1}{8}$	2 $\frac{1}{8}$	2
C. Goos	2 $\frac{1}{4}$	2 $\frac{1}{8}$	1 $\frac{7}{8}$	2	1 $\frac{7}{8}$	2	2
H. P. Clarke	2 $\frac{1}{8}$	2 $\frac{1}{4}$	2 $\frac{1}{8}$	2 $\frac{1}{8}$	2 $\frac{1}{8}$	2 $\frac{1}{4}$	2 $\frac{1}{8}$
T. Taylor	1 $\frac{7}{8}$	2	2 $\frac{1}{8}$	2 $\frac{1}{8}$	2	2 $\frac{1}{8}$	2
C. M. Pickering	2 $\frac{1}{4}$	2 $\frac{1}{8}$	2	2 $\frac{1}{4}$	2 $\frac{1}{4}$	2 $\frac{1}{4}$	2 $\frac{1}{8}$
Mrs. L. Andersen	1 $\frac{3}{4}$	2	2	2 $\frac{1}{8}$	2	2	2
S. L. Grenier	2	2 $\frac{1}{4}$	2 $\frac{1}{8}$	2 $\frac{1}{8}$	2 $\frac{1}{8}$	2 $\frac{1}{4}$	2 $\frac{1}{8}$
N. A. Singer	2 $\frac{1}{4}$	2 $\frac{1}{8}$	2 $\frac{1}{4}$	2 $\frac{1}{8}$	2 $\frac{1}{8}$	2 $\frac{1}{8}$	2 $\frac{1}{8}$
J. W. Newton	1 $\frac{7}{8}$	2	2	2	2	2 $\frac{1}{8}$	2
Geo. Trapp	1 $\frac{7}{8}$	1 $\frac{7}{8}$	2	2	2 $\frac{1}{8}$	2	2
G. Williams	2 $\frac{1}{4}$	2 $\frac{1}{8}$	2	2	1 $\frac{7}{8}$	1 $\frac{7}{8}$	2
W. A. Wilson	2 $\frac{1}{4}$	2 $\frac{1}{8}$	2 $\frac{1}{8}$	2 $\frac{1}{8}$	2 $\frac{1}{4}$	2 $\frac{1}{4}$	2 $\frac{1}{8}$
O. Goos	1 $\frac{7}{8}$	2	1 $\frac{7}{8}$	2	2 $\frac{1}{8}$	2 $\frac{1}{4}$	2
J. W. Short	2 $\frac{1}{8}$	2 $\frac{1}{8}$	2	2 $\frac{1}{8}$	2	2	2 $\frac{1}{8}$
Bathurst Poultry Farm	2 $\frac{1}{8}$	2	2	2	1 $\frac{7}{8}$	1 $\frac{3}{4}$	2

WEIGHT OF EGGS, SINGLE HEN PENS—*continued.*

	A.	B.	C.	D.	E.	F.	Average.
	Oz.	Oz.	Oz.	Oz.	Oz.	Oz.	Oz.
HEAVY BREEDS.							
H. M. Chaille	2	2	2 $\frac{1}{8}$	2 $\frac{1}{8}$	1 $\frac{7}{8}$	2 $\frac{1}{8}$	2
J. Potter	2	2	2	2	2	2 $\frac{1}{4}$	2
Parisian Poultry Farm	2	1 $\frac{7}{8}$	1 $\frac{7}{8}$	1 $\frac{7}{8}$	2 $\frac{1}{8}$	2 $\frac{1}{8}$	2
Rev. A. McAllister	2 $\frac{1}{8}$	2 $\frac{1}{4}$	2 $\frac{1}{8}$	2 $\frac{1}{8}$	2 $\frac{1}{8}$	2 $\frac{1}{4}$	2 $\frac{1}{8}$
J. E. Smith	2 $\frac{1}{4}$	2 $\frac{1}{4}$	2 $\frac{1}{4}$	2 $\frac{1}{4}$	2 $\frac{1}{8}$	2 $\frac{1}{4}$	2 $\frac{1}{4}$
R. Burns	2 $\frac{1}{4}$	2 $\frac{1}{4}$	2 $\frac{1}{8}$	2 $\frac{1}{8}$	2 $\frac{1}{8}$	2 $\frac{1}{8}$	2 $\frac{1}{8}$
E. F. Dennis	2 $\frac{1}{8}$	2 $\frac{1}{8}$	2 $\frac{1}{8}$	2 $\frac{1}{8}$	2 $\frac{1}{8}$	2 $\frac{1}{4}$	2 $\frac{1}{8}$
T. Hindley	1 $\frac{7}{8}$	2 $\frac{1}{8}$	1 $\frac{7}{8}$	1 $\frac{7}{8}$	1 $\frac{7}{8}$	1 $\frac{7}{8}$	1 $\frac{7}{8}$
A. E. Walters	1 $\frac{7}{8}$	2 $\frac{1}{8}$	2	2	1 $\frac{7}{8}$	2 $\frac{1}{8}$	2
C. C. Dennis	2 $\frac{1}{8}$	2 $\frac{1}{8}$	2	2	2	2	2
R. Holmes	1 $\frac{7}{8}$	2	2	2 $\frac{1}{4}$	2	2 $\frac{1}{8}$	2
Miss L. Hart	2 $\frac{1}{8}$	2 $\frac{1}{4}$	2 $\frac{1}{4}$	2 $\frac{1}{4}$	2 $\frac{1}{8}$	2	2 $\frac{1}{8}$

GROUP PENS.

	Average. Weight.		Average Weight.

LIGHT BREEDS.

	Oz.		Oz.
T. H. Craig	2 $\frac{1}{8}$	A. Martin	2
H. Trappett	1 $\frac{7}{8}$	Parisian Poultry Farm	1 $\frac{7}{8}$
H. G. C. Wenck	2 $\frac{1}{8}$	C. H. Singer	2 $\frac{1}{8}$
B. Hawkins	2 $\frac{1}{8}$	R. C. Bartlem	2
J. Purnell	2	Brampton Poultry Farm	1 $\frac{7}{8}$
A. Anders	2 $\frac{1}{8}$	E. Symons	2 $\frac{1}{8}$
G. H. Richardson	2 $\frac{1}{8}$	J. H. Jones	2
N. J. Nairn	1 $\frac{7}{8}$	E. Stephenson	2 $\frac{1}{8}$

HEAVY BREEDS.

R. Burns	2	H. B. Stephens	2
W. C. Trapp	1 $\frac{7}{8}$	R. Innes	2
Mrs. L. Maund	2	Jas. Hitchcock	2
C. Rosenthal	2	Mrs. A. Kent	1 $\frac{7}{8}$
V. J. Rye	1 $\frac{7}{8}$	J. Hutton	2 $\frac{1}{8}$
W. Becker	2	Mrs. A. E. Gallagher	2 $\frac{1}{8}$
Wombo Poultry Farm	2	C. Doan	2

THE BIRTH OF ANOTHER CO-OPERATIVE ENTERPRISE.

Shipping Queensland Eggs to London.

Every person who is engaged in poultry-raising knows well that eggs at their present market value do not cover actual cost of production, and the lot of the poultry farmer would have been even worse had it not been for a new avenue of disposal of the surplus supply of eggs by export. Some millions of eggs have been sent South during the present "glut" season, but it is to the credit of the "Nupba" Co-operative Society Limited, that they arranged and carried out the first direct shipment of eggs from Brisbane to London.

The steamer "Leitrim" recently sailed for England with 400 odd cases, representing some 150,000 eggs, consigned from the society to the Overseas Farmers' Co-operative Federation. Although a very small quantity comparatively, this shipment is extremely important as it marks the commencement of a new era for the Queensland poultry farmer.

This useful society, which was founded by the Queensland Branch of the National Utility Poultry Breeders' Association, was primarily intended to supply the needs of the poultrymen with foodstuffs for their flocks at a low figure; but, in addition to doing this, the directorate, seeing the necessity of finding other markets for eggs during the season of heavy production, turned its attention to the handling of eggs. It is now prepared to accept consignments from all members; in fact, it is desired and hoped that ere long all persons engaged in the industry will recognise the need for organisation, and by sending their eggs through the society's pool ensure the fullest possible return for their product.

Latest reports from London as to the state of the market there seem to indicate that the financial results of the venture will be highly satisfactory.

The society has adopted the policy of paying a certain sum per dozen as an advance against the eggs, and when the proceeds come to hand from London, the expenses will be deducted and the balance distributed amongst all the suppliers on a *pro rata* basis.



PLATE 79.—PART OF A RECENT CONSIGNMENT OF EGGS SHIPPED BY THE "NUPBA" CO-OPERATIVE SOCIETY TO LONDON.

Every care has been taken in selection and packing so that the eggs should arrive safely and open up in an attractive manner. Particular attention has been paid to quality and size and no egg under 2 oz. in weight is being packed. The cases, which are made from specially selected timber, are divided into two compartments (each of which holds 15 dozen eggs), and white and brown eggs are packed in separate boxes. White patent fillers and wood wool are used for protection against breakage, and the general appearance of the eggs should satisfy the most exacting. On the outside of the cases "Eggs—Product of Queensland" is stamped in big lettering, and the State should have reason to be proud of this shipment.

The Agricultural Council has already recognised the need for fostering this industry, which already represents millions of pounds of wealth to Australia, and is capable of unlimited extension. When one considers that Great Britain consumes over 12,000,000 eggs daily, it will be seen what an opportunity there is for export to that country, particularly as our season of heavy production occurs just prior to the English winter.



PLATE 80.—EGGS FOR LONDON, A RIVERSIDE SCENE.



PLATE 81.—THE S.S. "LEITRIM" LOADING EGGS AT BRISBANE FOR LONDON.

NATIONAL UTILITY POULTRY BREEDERS' ASSOCIATION COMPETITION.

Two thousand six hundred and eighty-nine eggs were laid during the month of October, or an average of 22.41 eggs per bird for the period. There have been one or two cases of broodiness, but the proportion has been very small indeed. The health of the birds generally still continues to be good, and in this respect, as well as the records of the birds, the competition compares very favourably with other similar contests.

Pen No.	Owner.	October.	Total.	Pen No.	Owner.	October	Total.
---------	--------	----------	--------	---------	--------	---------	--------

WHITE LEGHORNS.

29	A. S. Walters ...	26	177	59	C. Pickering ...	2	131
2	A. Niel ...	31	176	16	T. Flood ...	8	130
33	J. Purnell ...	26	169	57	M. Newberry ...	21	129
43	J. J. Davies ...	29	168	36	Parisian Poultry Farm	16	128
66	A. Cowley ...	29	166	82	E. C. Raymond ...	20	128
19	L. Andersen ...	26	164	54	A. W. Ward ...	25	128
27	Oakleigh Poultry Farm	27	161	40	P. J. Fallon ...	27	128
77	Kelvin Poultry Farm	23	160	26	P. F. Adams ...	23	127
62	H. Sturman ...	23	160	8	J. Harrington ...	18	125
64	G. Trapp ...	28	159	41	G. Williams ...	20	125
12	J. Potter ...	29	158	73	A. F. Knowles ...	10	124
7	J. Harrington ...	25	158	76	A. J. Bourne ...	26	124
72	Enroh Pens ...	25	157	18	R. Shaw ...	26	123
38	Carinya Poultry Farm	21	155	74	A. F. Knowles ...	10	121
25	P. F. Adams ...	24	155	22	E. Stephenson ...	20	121
34	J. Purnell ...	26	155	56	W. H. Lingard ...	22	121
61	H. Sturman ...	24	151	51	F. R. Koch ...	23	121
70	A. Hodge ...	26	151	37	Carinya Poultry Farm	25	119
68	R. D. Chapman ...	26	148	65	A. Cowley ...	22	115
47	M. J. Lyons ...	20	146	20	L. Anderson ...	25	115
55	W. H. Lingard ...	25	145	69	A. Hodge ...	9	113
63	G. Trapp ...	26	145	14	J. Hutton ...	23	109
53	A. W. Ward ...	28	143	23	M. H. Campbell ...	30	109
24	M. H. Campbell ...	20	142	28	Oakleigh Poultry Farm	4	107
39	P. J. Fallon ...	26	142	5	Wambo Poultry Farm	22	107
44	J. J. Davies ...	24	141	11	J. Potter ...	23	107
13	J. Hutton ...	26	140	81	E. C. Raymond ...	21	105
46	M. J. Lyons ...	23	138	45	H. Needs ...	22	105
52	F. R. Koch ...	27	138	60	C. M. Pickering ...	23	104
30	A. S. Walters ...	21	137	31	R. H. Woodcock ...	23	103
79	W. Bliss ...	31	136	15	T. Flood ...	18	101
9	P. Ruddick ...	22	135	71	Enroh Pens ...	24	101
10	P. Ruddick ...	24	135	80	W. Bliss ...	25	101
49	R. Turner ...	23	135	50	R. Turner ...	22	100
35	Parisian Poultry Farm	20	134	78	Kelvin Poultry Farm	26	96
6	Wambo Poultry Farm	20	134	3	W. Becker ...	25	92
67	R. D. Chapman ..	27	134	4	W. Becker ...	19	81
17	R. Shaw ...	26	133	75	A. J. Bourne ...	26	74
46	H. Needs ...	25	133	32	R. H. Woodcock ...	21	72
58	M. Newberry ...	30	133	21	E. Stephenson ...	22	67
42	G. Williams ...	23	132	1	A. Niel ...	0	57

NATIONAL UTILITY POULTRY BREEDERS' ASSOCIATION COMPETITION—*continued*.

Pen No.	Owner.	October	Total.	Pen No.	Owner.	October	Total.

BLACK ORPINGTONS.

96	R. A. Boulton ...	28	169	99	L. J. Prichard ...	18	126
107	E. Walters ...	22	162	102	Parisian Poultry Farm	21	124
88	W. A. Blake ...	26	162	89	T. Brotherton ...	29	121
92	C. C. Dennis ...	29	160	111	A. Niel ...	26	119
105	H. Pearce ...	23	152	84	J. Hutton ...	23	119
93	E. F. Dennis ...	28	148	109	Wambo Poultry Farm	23	118
95	R. A. Boulton ...	24	146	87	W. A. Blake ...	30	114
101	Parisian Poultry Farm	19	141	106	H. Pearce ...	21	112
108	E. Walters ...	24	141	110	Wambo Poultry Farm	18	100
91	C. C. Dennis ...	26	141	112	A. Niel ...	27	94
100	L. J. Pritchard ...	22	138	98	Enroh Pens ...	17	93
90	T. Brotherton ...	5	133	94	E. F. Dennis ...	20	91
83	J. Hutton ...	22	133	97	Enroh Pens ...	24	71
103	J. Potter ...	18	132	85	Kidd Bros. ...	0	10
104	J. Potter ...	18	130				
86	Kidd Bros. ...	12	128				

OTHER BREEDS.

118	J. H. Jones ...	14	150	114	Parisian Poultry Farm	17	106
120	T. J. Carr ...	26	143	115	G. and W. Hindes	26	100
116	G. and W. Hindes	22	130	113	Parisian Poultry Farm	23	91
117	J. H. Jones ...	8	115				
119	T. J. Carr ...	26	112				

THE PRICE OF COTTON.

Conditions of the Government Advance.

The Minister for Agriculture and Stock (Hon. W. N. Gillies) has announced that, in accordance with the recent decision of the Government upon the question of ratoon cotton, the conditions under which advances will be made to growers of seed cotton, during the seasons 1922-1923 and 1923-1924, will be as follows:—

Season ending 31st July, 1923.

1. An advance of 5½d. per pound will be made on seed cotton of good quality (as defined in No. 2) and free from disease, delivered on rail or water.

2. Good quality cotton means seed cotton that is not ratoon cotton. It must be clean, properly packed, and not immature, stained, dirty, or otherwise damaged.

3. Seed cotton is cotton derived from seed planted annually. Ratoon cotton is applied to the second or any subsequent growth made by plants which have already been raised from seed, irrespective of whether such plants have borne a crop or not.

4. No advance will be made upon ratoon cotton, and such cotton will only be accepted at the grower's risk. It will not be passed through the gins until after the operations of the season for annual seed cotton have been completed, and it will not be exported to Great Britain. Full particulars of such ratoon cotton must be sent to the manager of the ginnery to which it is consigned at the time of despatch, and any ratoon cotton found to be mixed with annual seed cotton in any consignment will entail the rejection of the whole consignment.

5. Seed cotton found to be not of good quality as defined in these conditions may be rejected, subjected to a lesser advance, or treated on growers' account as the Minister may decide.



Sitting.—
HAROLD PARKER, Manager,
Messrs. William Calvert,
and Sons, Preston.

HIS EXCELLENCY SIR
MATTHEW NATHAN, P.C.,
G.C.M.G.

CROMPTON WOOD, Managing
Director, Messrs. Smith
and Rathbone.

Standing.—
Hon. CRAWFORD VAUGHAN,
Managing Director, Aus-
tralian Cotton-growing
Association.

E. G. E. SCRIVEN, Under
Secretary, Department of
Agriculture and Stock.

L. ATKIN, Instructor in
Cotton Culture.

Colonel HURLEY, C.M.G.,
Commonwealth Immi-
gration Department.

Hon. W. N. GILLIES, Minis-
ter for Agriculture and
Stock.

W. P. ASCROFT, Director
Australian Cotton-grow-
ing Association.

R. L. HARDING, Secretary
to the Delegation.

E. F. CARTER, Consulting
Engineer.

6. All grading and inspection of cotton at ginneries subject to an advance will be under the supervision and direction of officers of the Department of Agriculture and Stock, whose decision, subject to the right of appeal to the Minister, shall be final.

7. All cotton must be grown from seed obtained through the Department of Agriculture and Stock.

The advance mentioned in No. 1 is a minimum advance and any profit accruing after deducting the cost of ginning and marketing, will be divided *pro rata* amongst those who supplied the seed cotton.

Season ending 31st July, 1924.

1. Good quality cotton is defined as being seed cotton of good quality, free from disease and from the following defects:—That it is not ratoon cotton; is clean, properly packed, and not immature, stained, dirty, or otherwise damaged.

2. The term "ratoon cotton" is applied to the second or any subsequent growth made by plants which have already been raised from seed, irrespective of whether such plants have borne a crop or not.

3. Seed cotton is cotton in the seed from annual plantings.

4. An advance will be made for cotton of good quality, free from disease and defects:—

(a) To growers of seed cotton of 1½-inch staple—5½d. a lb.

(b) To growers of seed cotton of less than 1½-inch staple—4½d. a lb.

delivered at the nearest ginnery, or as may otherwise be arranged by the Department of Agriculture and Stock; but no advance will be paid to any grower for the product of more than 50 acres in any one season.

5. Any grower having a greater area of seed cotton than 50 acres can send his cotton from the area exceeding 50 acres for which advances are made, to the ginnery for ginning and marketing on owner's account and risk. Every grower of more than 50 acres of seed cotton must notify the manager of the ginnery and furnish him with full particulars of the excess quantity; failure to give information may jeopardise an advance on the first 50 acres.

6. The advances mentioned in No. 4 are minimum advances, and any profits occurring, after deducting the cost of ginning and marketing, will be divided *pro rata* amongst those who supplied seed cotton.

7. No ratoon cotton will be received at the gins.

8. Seed cotton delivered at the ginnery that is found to be of bad quality and not free from disease or defects as mentioned in condition No. 1, may be precluded from any advance, may be classed at a lesser value than the full advance, or treated on the owner's account as the Minister may decide.

9. All grading and inspection of cotton at ginneries, subject to an advance, will be under the supervision and direction of officers of the Department of Agriculture and Stock, whose decision, subject to the right of an appeal to the Minister, shall be final.

10. All cotton must be grown from seed obtained through the Department of Agriculture and Stock.

NOTE.—The rates and conditions of advances for the years 1925 and 1926 have yet to be determined.

QUEENSLAND TREES.

By C. T. WHITE, F.L.S., Government Botanist, and W. D. FRANCIS,
Assistant Botanist.

No. 15.

THE HAUER (*Dissilaria baloghioides*).

The Hauer is a very well-known tree in the "scrubs" (rain forests) of the North Coast line, where it is also known as Lancewood, Redheart, and Blackheart. The wood is very hard and somewhat flint-like, qualities which suggested the name Lancewood. It is much more durable than most of the scrub timbers and has been used for fencing posts. In general appearance, many of the trees somewhat resemble the Marara (*Weinmannia lachnocarpa*), but they are mostly smaller and the heartwood darker. The Hauer abounds in the Queensland coastal scrubs from Brisbane to Proserpine. There are a few trees of the species in Bancroft Park, Kelvin Grove. Most of the trees known to the authors are tall and slender, and rarely exceed 2 feet in barrel diameter. The bark is dark-brown, almost smooth, and often shed in thin flakes or strips; when cut it is seen to be red and measures $\frac{1}{8}$ inch in thickness on a tree with a barrel diameter of 1 foot 9 inches.



Photo. by the Authors.]

PLATE 83.—THE HAUER (*Dissiliaria baloghoides*).
A specimen in the Kin Kin scrub.

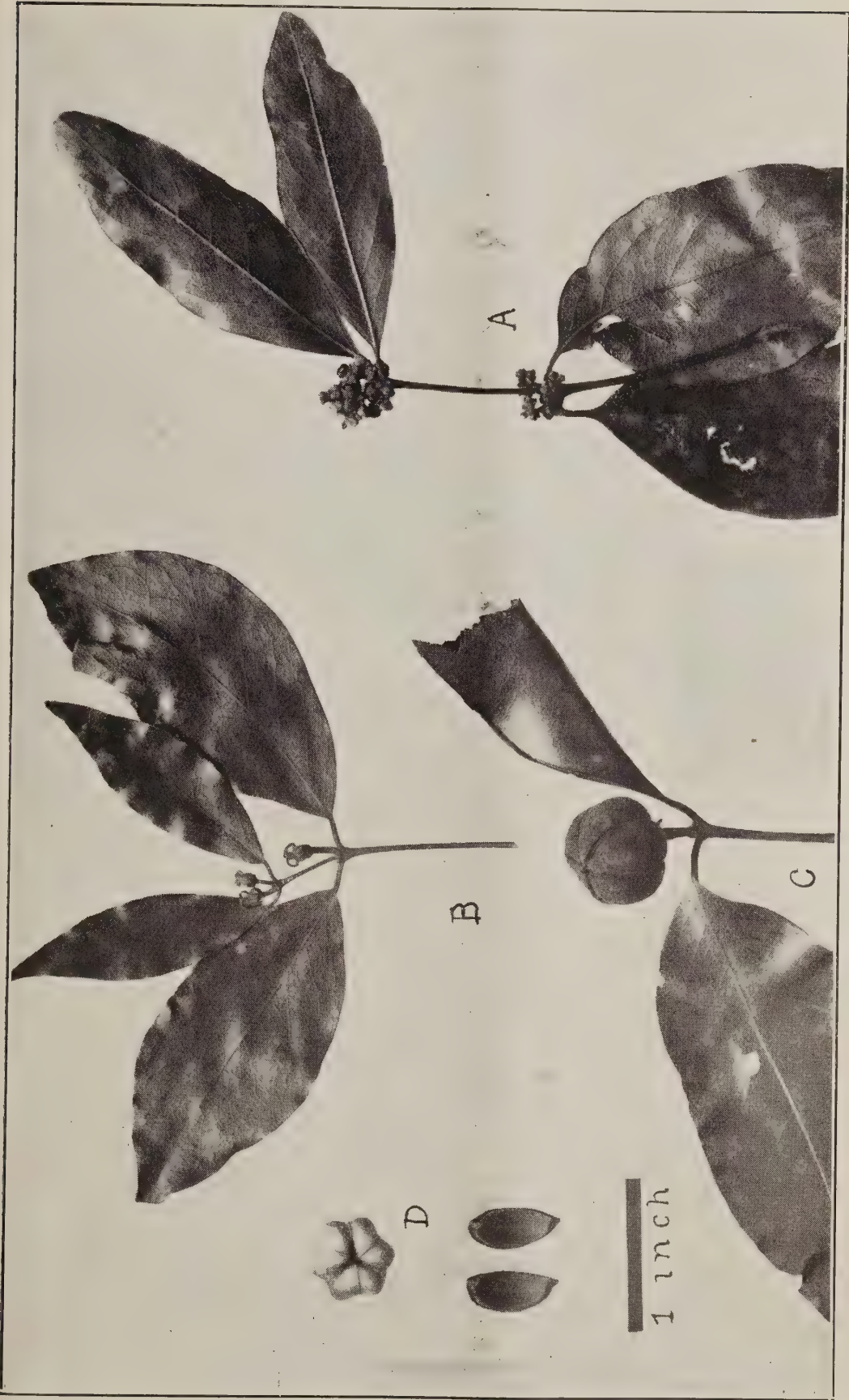


PLATE 84.—THE HAUER.

Showing, A male flowers, B female flowers, C capsule, D capsule with outer covering removed.

Photo : Dept. Agriculture and Stock.]

THE DAIRY HERD, QUEENSLAND AGRICULTURAL COLLEGE, GATTON.

MILKING RECORDS FOR SEPTEMBER, 1922.

Name of Cow.	Breed.	Date of Calving.	Total Milk.	Test.	Commercial Butter.	Remarks.
			lb.	%	lb.	
Bellona	Ayrshire ...	30 Aug., 1922	1,020	4.0	57.70	
Confidence	" ...	13 Aug., "	780	4.0	36.30	
Thyra of Myrtle-view	" ...	22 Aug., "	810	3.5	33.00	
Hedges Nattie ...	Friesian ...	20 May, "	690	3.8	30.90	
Songstress	Ayrshire ...	4 July, "	660	3.7	28.50	
Miss Fearless ...	" ...	30 May, "	600	4.0	27.90	
Dawn of Warragaburra	Jersey ...	17 May, "	510	4.7	27.90	
Yarraview Snowdrop	Guernsey ...	1 Sep., "	540	4.4	27.90	
Pretty Maid of Haremar	Ayrshire ...	11 Sept., "	540	4.4	27.90	
Magnet's Leda ...	Jersey ...	8 Feb., "	510	4.5	27.00	
College Cold Iron	" ...	25 Jan., "	420	5.4	26.70	
Dear Lassie	Ayrshire ...	19 June, "	600	3.6	25.20	
Miss Betty	Jersey ...	17 May, "	450	4.6	24.30	
Prim	Friesian ...	6 Feb., "	630	3.3	24.30	
Snowflake	Shorthorn ...	20 Feb., "	540	3.8	24.00	
College Cobalt ...	Jersey ...	3 April, "	420	4.6	22.50	
College Ma Petite	" ...	5 Feb., "	420	4.5	22.20	
Netherton Belle ...	Ayrshire ...	19 July, "	480	3.9	21.90	
Fair Lassie	" ...	1 Sept., "	600	3.0	20.70	
La Hurette Hope	Jersey ...	30 June, "	420	4.2	20.70	
College La Cigale	" ...	10 July, "	420	4.1	20.10	

Rainfall for the Month, 96 points.

ILLUSTRATED NOTES ON THE WEEDS OF QUEENSLAND.

By C. T. WHITE, Government Botanist.

No. 27.

TUMBLING MUSTARD OR ORIENTAL ROCKET (*Sisymbrium orientale*).

Description.—An erect branching annual or biennial herb about 1 to 3 feet high. Stems smooth or clothed with a few hairs. Leaves glabrous or more commonly thinly clothed with longish hairs tapering at the base into long slender stalks; lower leaves deeply lobed, the terminal lobe the largest; uppermost leaves narrow-lanceolate, entire (not lobed or toothed). Flowers small, yellow; seed pods very slender, straight or more or less curved, 3 to 4 inches long, slightly hairy; seeds very numerous, small (about $\frac{1}{2}$ line long), oval with a U-shaped furrow on one side, light brown in colour.

Distribution.—A native of Southern and Central Europe; now a naturalised weed in many countries.

Botanical Name.—*Sisymbrium*, from the Greek word *sisymbron*, the name of some sweet-smelling plant, probably mint or thyme; *orientale* (Latin) meaning eastern, no doubt, from the plant extending to Eastern Europe and Western Asia.

Properties.—Not known to possess any economic properties. It is not harmful in any way, but, like other plants of the family Cruciferae, would, no doubt, give a turnip-like taint to the milk of cows feeding on it to any extent.

Eradication.—So far as observed in Queensland, the "Tumbling Mustard," though fairly common, is not very aggressive; and beyond hand pulling or hoeing, calls for no special methods of eradication. Its smooth leaves and stems militate against the use of sprays. Though occasionally found in northern parts, it is more abundant in the cooler parts of the State.

Botanical References.—*Sisymbrium orientale*, Linn. Cent. Plant. 11, 24; Jacq. Fl. Austr. IV. 12.

This weed was referred by the late F. M. Bailey ("Queensland Agricultural Journal," Vol. XXI., 1908, p. 292) to *S. Irio*, but seems to agree better with the plant described above. It is also very similar to *S. altissimum*, a common weed in Canada and the United States, only differing in one or two minor characters.



Photo : Dept. Agriculture and Stock.]

PLATE 85.—TUMBLING MUSTARD, OR ORIENTAL ROCKET (*Sisymbrium orientale*).

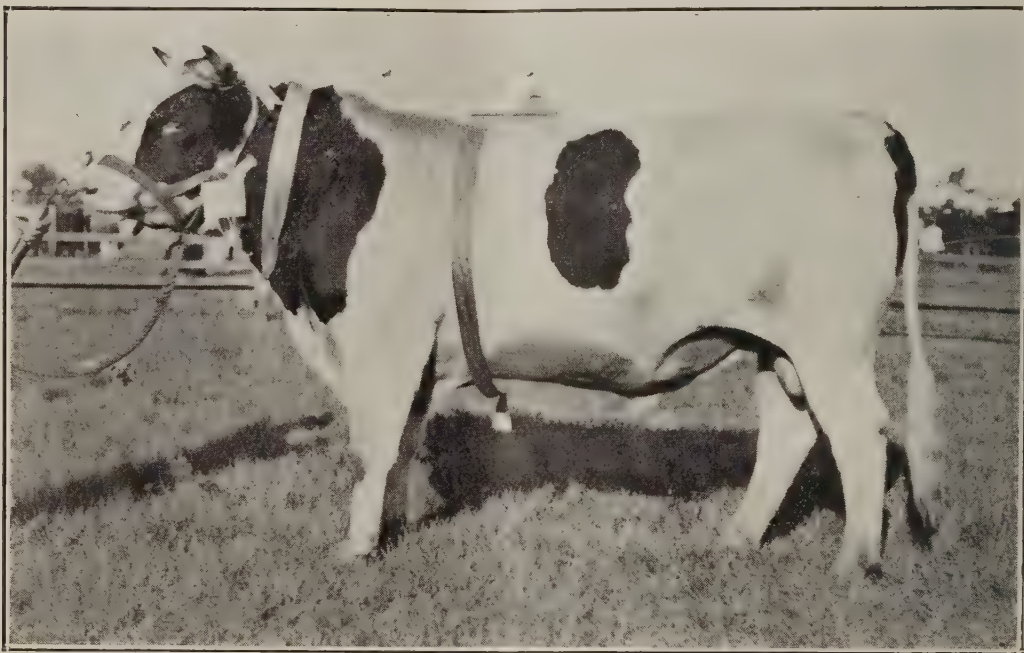


PLATE 86.—BELL DE KOL ONGARRIE (IMP., N.Z.)

A direct descendant of the World's Champion Friesian Cow, Westmere Princess Pietertge, the gainer of an official record of 939.78 lb. butter in one year. The property of Mr. P. P. Falt, Ryfield Friesian Stud, Tingoorra.



PLATE 87.—OAKLEA NOREEN (IMP., NO. 251).

A cow with an official record of 62 lb. milk, 3.80 lb. butter in 24 hours. Winner of nine Home Milking Competitions against all breeds, also winner of Royal National Home Milking Competition, 1921. She holds the production record for Queensland over all cows of all breeds at her age, 4 years 2 months o'd. The property of Mr. P. P. Falt.

THE SOLAR ECLIPSE.

GEOLOGICAL SIGNIFICANCE OF SOLAR PHENOMENA—IS A DROUGHT LOOMING?—THE JENSEN THEORY OF INTER-RELATIONSHIP.

The recent total eclipse of the sun clearly demonstrated that we are approaching a sunspot minimum, which, in its turn, raises the question whether the earth's climate and such phenomena as earthquakes, volcanic eruptions, and droughts are influenced or not by sunspot conditions. It will be interesting, in the circumstances, to see if the coming year—1923—which will be a year of sunspot minimum, will be accompanied, so far as Australia is concerned, with drought conditions and by volcanic eruptions and earthquakes in other parts of the world.

SUNSPOTS AND TERRESTRIAL DISTURBANCES.

Dr. H. I. Jensen (Queensland Geological Survey) has advanced the theory of the inter-relation between sunspots and terrestrial disturbances. Sir Edgeworth David, commenting on this theory in the Sydney "Daily Telegraph" of 16th January, 1907, expressed the opinion that it was "one of the most reasonable yet put forward, as Jensen had quoted an immense amount of evidence to show that there was a distinct inter-relation between sunspots on the one hand and volcanic and seismic phenomena on the other."

According to the Jensen theory, during the sunspot minimum, earth temperature is probably also at a minimum, and consequently heat is then being radiated outwards into space more rapidly than at other times, thereby intensifying the contraction and fracturing of the earth's crust, both of which processes are, no doubt, very important factors in producing earthquakes and volcanic eruptions. At the same time, as there is a close relation between earth magnetism and sunspots, it is possible that variations in earth magnetism depending for their periodicity on the sunspot period, or half period, may also be a determining factor.

SUNSPOT MINIMUM AND DROUGHTS.

It has been proved that in years of minimum sunspot intensity Queensland experiences scorchingly hot summers, and every part has cold winters for its latitude. In New South Wales the summers are hot, with frequent north-west winds, relieved at times by "southerly busters"; the winters are cold and rather protracted, but as the atmosphere is dry, the cold is not felt as much as in the wet winters accompanying a sunspot maximum, and the nights are not rendered unpleasant by rain, fog, or snow. In years of minimum sunspot intensity, the Central Australian cyclonic area in summer is of comparatively small dimensions, and consequently the outward-blowing hot winds reach the surface of the earth in the coastal districts, giving (for instance, Sydney) frequent north-west winds. In winter this area is covered by a vast permanent anti-cyclone, from which the cold, dry westerly winds originate. The anti-cyclone belt is greatly widened, and the rain-bringing monsoonal and antarctic V disturbances are consequently not frequent.

It is no mere coincidence that the years 1811-12, 1844-46, 1864-69, and 1896-1902 were years of drought in the greater part of the world, and at the same time periods of sunspot minimum. Nor does it seem a coincidence that 1864, 1870-72, 1893-4—periods of sunspot maximum—were wet years over the greater part of the earth's surface.—"Queensland Government Mining Journal."

KUDZU.

A REMARKABLE FODDER PLANT—A QUEENSLAND FARMER'S OBSERVATIONS.

Impressed by glowing accounts of Kudzu as a fodder plant, Mr. Hugh McMartin, of Pullen Vale, Indooroopilly, obtained some roots for local experiment. Of the results of this experiment Mr. McMartin writes:—

It is now a little over a year since the Kudzu Fodder Vine was introduced to Queensland and the first roots set on my farm at Pullen Vale, but such has been the headway made by the plant that even in this short period sufficient has been learnt of its characteristics and habits to give one a fair idea of its possibilities under local conditions. The reputation earned by Kudzu in Florida, U.S.A., is so remarkable that one may be pardoned for being at least a little sceptical as to the truth of the claims made for it by enthusiastic growers in the United States, but the writer has had ample evidence to prove that Kudzu will show results here almost, if not quite equal, to those obtained overseas.

In the first place Kudzu is an exceptionally rapid grower, and I have observed the main runners to advance at the rate of eight to nine inches during twenty-four hours in damp, warm weather. It will resist dry weather effects splendidly, as evidenced by the fact that although we have had little beneficial rain for over seven months my Kudzu vines are a mass of succulent, dark green leaves and the runners are growing several inches a day.

Kudzu, being a deep-rooter, can obtain a plentiful supply of moisture from the soil and subsoil while the average of our grasses and shrubs are perishing.

I have tested the plant under the most severe conditions of heat, drought, and frost, and it has come through them all remarkably well.

Such great growth progress has Kudzu made here that I have even been able to carry out a few small experiments in stock feeding with it, and once more the result has been most gratifying. During the very dry winter the Kudzu patch was fed down several times with sheep, and on each occasion, despite the absence of rain, no sooner were the animals removed than the plant began to send out fresh shoots. I was also agreeably surprised to observe that sheep which had become anaemic recovered remarkably when fed on Kudzu.

My Kudzu vines have given no evidence of a desire to seed, propagation being from the roots that strike into the ground from the nodes on the main runners.

An American claim for Kudzu is that it will carry six milking cows to the acre when grown on trellises about 12 feet apart; also that as much as 10 tons of fodder per acre may be obtained from it. Judging by its performances here to date, I see no reason to discredit these claims. Once stock begin eating Kudzu they soon become exceedingly fond of it, and the grower will be well advised to keep the fences surrounding his Kudzu patch quite stock proof. Wild creatures such as hares, wallabies, and bandicoots also evince a keen desire to investigate the Kudzu vines, and will take most unusual risks to feed upon it.

In order to obtain a satisfactory "strike" Kudzu roots should be planted in damp soil and watered every few days for about a fortnight. Once started the plant looks after itself.

It seems highly unlikely that Kudzu can ever become a pest in any way. Its leaves are soft and juicy, like other legumes, and, of course, it is quite unprotected by thorns.



PLATE 88.—IN A DAWSON VALLEY GARDEN. A MINISTERIAL VISIT TO CRACOW STATION.

From the Right: THE PREMIER HON. E. G. THEODORE, MR. F. M. FORDE, M.L.A.,
HON. JAMES STOPFORD, —, HON. J. LARCOMBE.

Event and Comment.

Saving an Industry—Proposed Arrowroot Pool.

The arrowroot industry is threatened with extinction. With stocks on hand equalling about two years' normal consumption, and lacking selling organisation, the growers are helpless. The price they are receiving for their labour is below the cost of production and bears no relation to the price paid for arrowroot by the consumer. Adversity has brought growers and manufacturers together, and on 20th September last, a deputation comprising arrowroot growers waited upon the Wheat and General Agriculture Committee of the Council of Agriculture with the object of explaining the present position of the industry in Queensland, and urging upon members the need for an arrowroot pool. The Committee sympathised with the request, and deputed the Director (Mr. L. R. Macgregor) to visit localities where the crop is grown and obtain first-hand information respecting the condition of the industry. Subsequently, at Beenleigh, he addressed what is said to have been one of the largest meetings of primary producers ever held at that centre. The growers were shown how the principle of co-operation applied to their industry would tend to eliminate speculators and operate in the direction of a more stabilised market. He stressed the fact that co-operation rests upon the common economic interests of men engaged in the same pursuit, and unfolded a marketing plan which promised to save the arrowroot industry.

At the last meeting of the Council of Agriculture, a deputation of those engaged in the industry attended and presented a petition signed by growers present at the Beenleigh meeting, asking the Council to recommend to the Government the constitution of a pool. The deputation urged that immediate action be taken to institute the pool, as the planting season is now almost completed and it is urgently necessary to reassure the planters.

The matter was considered by the Council, and it was decided to recommend the immediate establishment of a pool in accordance with the provisions of the Primary Products Pools Act of 1922. The Premier (Hon. E. G. Theodore), to whom the circumstances of the industry were explained by Mr. Macgregor, has taken prompt action, and it is understood that an Order in Council has been approved notifying the intention of the Governor in Council to declare arrowroot a commodity under the Primary Products Pools Act.

The Director pointed out that the institution of a pool will not involve Government control of the product. The Pools Act was not designed for that purpose. In fact, the Act specifically lays down that boards administering pools will not represent the Crown for any purpose whatsoever. It is provided that, when a pool is constituted under the Act, representatives of growers shall be appointed to administer and control the affairs of the pool.

The marketing plan drawn up by Mr. Macgregor is not a hard and fast set of rules, but merely sets out certain suggestions for the guidance of the representatives of growers. Provision is made for creating a local demand for the product, the qualities of which are little known to the public. Judicious publicity to stimulate this demand is recommended, and if this policy be given effect to, the existing stocks can most readily be cleared before next season.

Growers of arrowroot and those millers who have invested capital in plant and machinery will now be considerably relieved. They will view the future with more confidence, and before the planting season closes will, no doubt, plant the full area of land they have available with excellent prospects of a reasonable return.

An Experiment in Lamb-raising—Kudzu Leaves and Sweet Potatoes.

An experiment in lamb-raising which should be of much interest to Queensland coastal stockowners is being carried out by Mrs. Hugh McMartin, of Pullen Vale, Indooroopilly. Taking three Dorset Horn ewes with young lambs at foot, about two months ago, Mrs. McMartin began feeding the mothers with a diet of which the principal items were leaves of the Kudzu fodder vine and sweet potatoes. Almost at once a remarkable change for the better was shown in the condition of both ewes and lambs, giving the observer the impression that the mothers' milk flow had improved both in quantity and quality. When the youngest lamb was

fifty days old they were weighed. One ram lamb, fifty days old, scaled 53 lb.; another ram lamb, fifty-five days old, weighed 54 lb.; and a ewe lamb, fifty-nine days old, 54 lb.

Both ewes and lambs appeared to relish the unusual diet exceedingly, and every particle of their Kudzu-potato meals is greedily devoured. The lambs are to be weighed again when the youngest is seventy-five days old.

Profitable Lambs—An Interesting Test.

For the purpose of comparing the relative advantages of using Dorset Horn and Corriedale rams on first cross ewes to raise lambs for sale in the sucker stage, a test is being conducted at the Wagga Experiment Farm, where 400 Border Leicester Merino cross ewes were mated with Dorset Horn rams and a similar number with Corriedales. The first sucker lambs of the two series to be ready for market—being about four and a-half months old—were sold recently at public auction with the result that the Dorset Horn cross lambs averaged 21s. 7½d. per head and the Corriedale cross averaged 19s. 8½d. The New South Wales departmental Sheep and Wool Expert (Mr. F. B. Hinton), in reporting the result of the sale, mentioned that the Dorset Horn suckers were much admired and were more fancied by the export buyers than the others.

“Bunchy Top” in Bananas.

The Minister for Agriculture and Stock (Hon. W. N. Gillies) is closely interested in the developments relating to a reported discovery of a means of defeating the “bunchy top” disease on border plantations and the department is well informed as to the progress of experiments and tests being carried out by the trans-border authorities and others interested, including Mr. Marks, of Terranora, Tweed River. So far, only a small measure of success has attended official tests and experiments and this fits in with the experience of the Fijian authorities. In Fiji, where it is known as “strangles,” “bunchy top” is said to have existed there for forty years.

To check the spread of the disease, the New South Wales agricultural and fruit authorities, in addition to experiments and tests and dipping and manurial investigations, have prohibited the removal of banana suckers from certain of the Northern Rivers areas.

The affected region reaches down towards Byron Bay, and the Brunswick River is now affected. The Richmond River area is clean. Plants may not be taken south of a line drawn from east to west south of the Brunswick. Great care is also being taken in respect of the introduction of plants from Queensland. No plants may be taken there from Queensland unless the Government banana expert, inspector, and instructor (Mr. Reg. G. Bartlett), of the New South Wales Department, has first inspected the Queensland plantations from which it is proposed to purchase the suckers, and also unless they have been inspected by him when they reach the border at the Tweed.

“Bunchy Top” or “Choke Throat.”

In the course of a recent Press interview, Mr. Bartlett said that, despite reports to the contrary, he believed that there was no “bunchy top” in Queensland north of Nerang. Many growers confused “bunchy top” with what was known as “choke throat”—a form of growth which had been very prevalent in both New South Wales and Queensland. It was simply due to the adverse seasonal conditions—the dry weather—ruling about six months ago, which caused the throat of the banana to contract at the top, and the bunch was thus unable to emerge. However, growth took place from the bottom, and the stem was pushed round, sometimes in a circle and sometimes into an “N” shape. Thus it was sometimes referred to as “goose neck.”

Mr. Bartlett pointed out that a similar trouble was experienced in Queensland seven or eight years ago in one of the best of spring seasons so far as rainfall went, but it followed an extremely dry autumn and hard winter.

Notwithstanding the inroads of “bunchy top,” the production of bananas in New South Wales had materially increased. This was due to the fact that new areas had been, and were being, brought under bearing. Nevertheless, many growers were being forced out of the industry. So far the only remedy seemed to be to cut out the plants.

Mr. Marks, of Terranora, who was carrying out further tests with his remedy for "bunchy top," was very optimistic of the result. So optimistic was he that in an arrangement with a growers' organisation for tests over a stated period, and for which, if successful, he was to receive a substantial reward, he refused an offer that he should be required to demonstrate only 95 per cent. free over a period of two years, and claimed that he could demonstrate 100 per cent. free. The results of the test were being awaited with the utmost interest. The Government intended to run parallel experiments to test Mr. Marks' theory and treatment.

Co-operative Marketing.

The benefits of co-operative marketing are now being recognised by primary producers all over the world, and Queensland farmers have already experienced something of the advantages accruing from practical applications of this principle. Much good, solid spade work has already been done on the commercial side by existing co-operative companies, and to them is due the credit that should be accorded the pioneers in any forward movement. In some directions, however, particularly in the matter of marketing, it has been found that separate co-operative units operating independently cannot protect fully the interests of primary producers. Modern marketing economy, therefore, demands unity of effort by instituting methods of compulsory co-operative marketing, which have become to be known as "pools." War-time experience demonstrated the advantages of this form of co-operation by—(1) eliminating unnecessary cost as between grower and consumer; (2) blocking unnecessary competition between growers to the benefit of unnecessary middlemen; (3) stabilising prices; and (4) facilitating the financing of marketing and other operations. So manifest were the advantages through war-time pools that a large volume of opinion among the producers of the Commonwealth is now definitely and strongly in favour of the perpetuation of the pooling principle.

Procedure in Instituting a Pool.

On the recommendation of the Council of Agriculture, the Minister may, by notice in the "Gazette," notify the intention to make an order instituting a pool in thirty days from the date of "Gazette" notice. The board of representatives of growers, when appointed by Order in Council, would then proceed to make arrangements for the receiving, financing, and marketing of the commodity, and would be responsible to account to the growers for the proceeds. All of the particular commodity being pooled, grown in the State, unless by specific exemption, would, upon the constitution of a pool, be marketed by compulsory co-operation for the benefit of the growers by the board of growers' representatives.

Within thirty days after the publication of the first notice of the proposal to make an order to constitute a pool, if fifty or more growers in the district concerned petition the Minister to take a poll before the order is made, the Minister shall take a vote of the growers of the product on the question, and if less than three-fourths of the votes are polled in favour of the pool, the order to constitute a pool shall not be made. "*The Primary Products Pools Act of 1922*" was designed for the benefit of the producers of our main primary products. It is a measure planned in the interests of producers, and providing for control by producers of the products of their own industry.

The Need for Pooling Legislation.

Pools constituted during war time had the protection of the War Precautions Acts and kindred legislation, whereby the boards charged with the administration of these pools were clothed with adequate powers to complete financial and all other arrangements, to enter into legal contracts, to sue and to be sued, and generally to carry out the work entrusted to them on behalf of the producers. Voluntary pools not protected by legislation have experienced difficulties in all of these respects. By legal decisions in Commonwealth Courts of Law, notably in the instance of the Port Huon (Tasmania) fruitgrowers' action, and in the Victorian oniongrowers' case, contracts made by voluntary pools have been judicially set aside, and the objects for which such pools were constituted have been nullified. Moreover, voluntary pools have found it difficult to afford their pool growers sufficient protection against produce, not in the pool, being used in prejudicing and undermining the arrangements made for the marketing of the pooled product, to the detriment of growers as a whole.

Primary Produce Pools Act.

In order to meet these difficulties and to afford growers a means whereby pools may be given legal status, and to permit of growers' representatives exercising the necessary measure of control for the protection of the producer, the Minister for Agriculture (Hon. W. N. Gillies) introduced a Bill, which subsequently became law, last session, and which is now known as "*The Primary Products Pools Act of 1922.*" The provisions of the Act may be applied to any product of the soil in Queensland, and any dairy produce and any article of commerce prepared other than by process of manufacture from the produce of agriculture, or other rural occupations in the State.

Provision for Genuine Control by Growers' Representatives.

The Act in question is not designed to institute Government control of any commodity. In fact, the Act specifically lays down that boards administering pools will not represent the Crown for any purpose whatsoever. It is provided that when a pool is constituted under the Act, representatives of growers shall be appointed to administer and control the affairs of the pool. The Act provides for no Government representation whatever, but the Legislature, with a view to protecting the rights of every producer interested in a pool, has stipulated that the Auditor-General shall exercise an oversight over the financial transactions of every pool and audit its accounts, and that in this connection also the Act provides that a statement of accounts shall be exhibited as may be prescribed by the Governor in Council. This is a precaution which every producer will readily endorse.

How Pools may be Formed.

The Act provides that a pool may be declared by Order in Council upon the recommendation to the Government by the Council of Agriculture. The case for the institution of the pool should be clearly set out. An estimate of the quantity produced, with information respecting localities of production, and, if possible, the cost of production, should be supplied, as well as an outline of the difficulties hitherto met with by growers in marketing the commodity in question. Finance is an important question confronting any proposed pool. The policy of the Federal Government in regard to a Commonwealth Fruit Pool, as enunciated recently, should serve as a guide to any pool in making their financial arrangements. The Commonwealth clearly laid it down that the credit of Australia (through the Commonwealth Bank) would be granted to a Fruit Pool provided that the Government was satisfied that the administration of the pool was in the hands of an efficient organisation which would protect the industry and the producers engaged in it, handle marketing problems, open up new markets, and generally advance Australia's interests by increasing production and export trade. As any Queensland Pool Board will necessarily have to arrange for finance (as provided in the Act) no doubt any financial institution if approached will also require to be similarly satisfied in this regard, and in any representations to the Council for the formation of a pool, full particulars of the proposed arrangements in regard to finance should also be submitted for the Council's guidance. The information required is somewhat analogous to that contained in the clause usually found in a prospectus outlining the satisfactory financial arrangements made with the vendors in regard to assets vital to the formation and carrying on of the business of a proposed company. Complete information must be prepared to enable the Council of Agriculture to arrive at a decision and to justify it in making the necessary recommendation to the Government.

Crossbred Wheat on Cecil Plains.

When the Cotton Delegation visited the Cecil Plains Soldiers' Settlement on the Darling Downs, its members were shown a splendid crop of wheat of the crossbred type. Captain Binnie, the supervisor of the settlement, had been inclined to plant a fairly large area with the Florence variety, but the State Director of Agriculture (Mr. H. C. Quodling) pressed him to sow crossbred wheat. He did so, and the good results obtained were readily apparent. While the Florence had failed in this particular instance, the crossbred type had thrived well, and at the time of inspection presented a very healthy appearance. Captain Binnie estimated that a four to five bag crop would be the result from the crossbred wheat—and nothing from the Florence variety. Usually Florence wheat is among the most prolific on the Downs, but it had failed under the conditions prevailing at Cecil Plains.

Don'ts for Cotton Planters.

Among recent callers to this Office was Mr. J. G. Powell, a cotton planter from the State of Georgia, U.S.A., who has been engaged by the Australian Cotton Growers' Association as an instructor in cotton culture. Mr. Powell has already seen something of Queensland cotton fields and noted the methods adopted by new growers. This has caused him to stress the following don'ts which are based on his own experience:—

1. Don't plant your cotton until the land is thoroughly prepared.
2. Don't try to plant cotton seed to proper stand, that is, correct spacing between stalks. Cotton growers have been experimenting on this for hundreds of years, and have not solved it yet. You are wasting time and labour instead of saving it. Plant thickly and cut down to proper stand with hoe when plants are 4 inches to 6 inches high.
3. Don't let weeds and grass get started; cultivate often, when shallow cultivating will suffice.
4. Don't plough or harrow deeply close to the drill, especially when the plants are in the more advanced stage.
5. Don't forget to replant by hand all missing spaces along the row as soon as possible.
6. Don't forget that the more fertile your land the thicker to leave the plants, but in no case less than 12 inches apart.
7. Don't have rows more than 4 feet apart. In most fertile land plant closer than in poorer soil.
8. Don't fail to keep your rows as near as possible a uniform width, this will aid you materially in cultivation.
9. Don't let soil form a hard crust after planting; break it as light as possible, preferably with spring tooth harrow.
10. Don't forget that proper planting and afterwards chipping down to proper stand, will produce a stalk of proper size, both for producing cotton and to assist materially in picking.

Revelation and Education.

In the course of a letter to the Premier (Hon. E. G. Theodore) Mr. R. Harding, Secretary to the Cotton Delegation, commented very interestingly on Queensland and her cotton future. He writes:—"May I offer you my sincerest thanks for the most interesting case of cotton samples which you have so very kindly sent me. Our tour through your State has been a revelation and a great education to me. I could not have believed the unbounded possibilities of Queensland unless I had been permitted to see them as we have. As the years go by and the cotton industry here expands until it rivals and surpasses the wool industry of Australia, an added interest and value will attach themselves to your gift and serve to remind me of the whole-hearted support and enthusiasm which you gave to that industry when it was in its birth."

The Dairy Industry—Reported Neglect of Cheese.

Speaking recently on a report furnished to the Agent-General by a London butter expert containing an allegation that Queensland was devoting undue attention to butter to the neglect of cheese, the Minister for Agriculture (Hon. W. N. Gillies) said that he would like to emphasise that Queensland, rather than neglecting cheese production as alleged, was the principal producer of cheese in the Commonwealth, and under normal conditions the cheese factories here manufactured more cheese than did any of the other States, while as far as the export trade was concerned 75 per cent. or more of the total complement of cheese exported each year from Australia had been of Queensland origin. Consequently it could not be rightly said that this State was responsible for neglect of the cheese branch of the dairying industry.

Mr. Gillies pointed out that the respective market quotations for butter and cheese fluctuated considerably, and on occasion it happened that the preference in the market value was in favour of butter, and in such instances the dairymen were inclined to supply cream to a butter factory rather than to supply milk to a cheese factory, and in this way the output of cheese was affected from time to time. To a limited extent this influence had been operative recently, but the chief factor causing a temporary reduction in the volume of the cheese output was the absence of rain in the dairy districts, causing an appreciable reduction in the quantity of milk supplied to the cheese factories. Immediately the weather broke the production of cheese would increase, provided that the price offering was considered satisfactory to producers.

Production, Prospects, and Prices.

The information set out hereunder has been abstracted from departmental summaries of market movements and weather conditions for the month of October.

Agriculture.

The first week of the term was rainless and the wheat outlook was growing more dismal. In localities where somewhat heavier rain had fallen in the early growing period wheat crops, though short and poorly developed, were just about holding their own. On the early planted and well-prepared lands the best crops were seen. Much of the growth was being fed off by dairy stock. Cotton was maintaining popular interest, and many plots were being prepared. The market was affected by the dry spell and prices firmed.

The second week saw a prospect of total grain failure in many wheat areas. Not an acre was freshened by a splash of the needful. There was still a prospect of a light crop where the most careful cultural operations had been carried out if rain followed soon. In the Inglewood district stock losses were reported. Early sown maize and potatoes, although looking well, were badly in need of a shower. Large areas of land were waiting for weather improvement to receive sowings of maize and cotton. All lines were in strong market demand.

Very useful and widespread rains were the most encouraging feature of the week ended 21st October, the third period of the month under review. Up to nearly 4 inches were registered in the agricultural areas. In localities on the wheat belt where crops were not beyond recovery, prospects brightened. Maize and other crops revived to a large extent. On the coast the rainfall was scattered and generally light, but pastures were refreshed to the extent of appreciably improving the cream yield.

Further beneficial rain fell in the course of the last week of the period under review throughout practically the whole of Southern Queensland. On the Darling Downs were registered the heaviest falls. Maize and cotton were being sown in large areas and generally the immediate outlook had improved vastly.

The Markets.

Product.	Week ended 7th October.	Week ended 14th October.	Week ended 21st October.	Week ended 28th October.
Lucerne chaff	Prime to 13s. 6d.; Inferior to 4s. 1d.	5s. to 12s.; Other lines held at 4s. 3d. to 11s. 3d.	5s. 3d. to 10s. ..	5s. to 9s. 3d.
Oaten "	Border, prime to 10s.; Local, 4s. 3d. to 5s. 6d.	7s. 6d. to 10s. 3d.; Local to 6s. 10d.	7s. to 9s. 9d. ..	9s. 6d.; Local 6s. to 8s. 2d.
Mixed "	6s. 7d. to 8s. 6d.	5s. 9d. to 8s. ..	5s. to 9s. ..	5s. 9d. to 8s. 10d.
Maize	Prime to 5s. 2½d.; Other to 4s. 11d.	5s. 2d. to 5s. 4d.	Unchanged ..	5s. 1½d. to 5s. 4d.
Potatoes ..	Prime to 17s. 9d.	To 19s. 2d. ..	Prime to 19s. 8d.; Others to 6s. 3d.	9s. 7d. to 16s. 10d.
Sweet potatoes	4s. to 8s. 6d. ..	4s. to 7s. 3d. ..	5s. to 6s. 6d. ..	5s. 6d. to 8s.
Pumpkins ..	4s. to 6s. 2d. ..	3s. 6d. to 6s. 3d.	2s. to 6s. 1d. ..	4s. to 7s. 9d.
Wheat (feed) ..	5s. 8d., passed	5s. 6d. to 6s. 3d.	5s. 6d. to 6s. 6d.	5s. 10d. to 6s. 5d.
Broom millet ..	Prime hurl, £50	£40 to £50 ..	Unchanged ..	Unchanged
Barley	Market bare ..	Unchanged ..	4s. 7d. .. ..	..

Live Stock.

ENOGGERA MARKETS (1st November).—At the Enoggera live stock markets on Wednesday, 1st November, 7,670 sheep were penned. With the exception of about 2,000 sheep from the Central district, which were in only store condition, the quality of the yarding was satisfactory, there being a large number of small drafts of good to prime sheep from the Darling Downs. There was a large attendance of butchers, including many from the country, and competition for good to prime sheep was brisk and well sustained. The market opened to a very strong demand, with prime wether mutton realising 5½d. to 6d. per lb. and continued at about this level throughout, closing sales being equal to the best of the day. A small draft of very prime shorn Merino wethers from the Darling Downs sold to 35s. and averaged 29s. 7d., and other drafts averaged 25s. to 27s. Quotations:—Three-quarter to full-woolled and half-woolled Merino wethers, none offering; short-woolled, 18s. to 35s.; half-woolled Merino ewes, 17s. to 23s. 3d.; short-woolled, 11s. to 23s. 3d.; three-quarter to full-woolled crossbred wethers, 33s. 6d. to 37s. 6d.; short-woolled, 19s. to 29s.; full-woolled crossbred ewes, 23s. to 28s.; short-woolled, 15s. to 27s. 6d. Prime heavy lambs, 16s. to 30s. 3d.; good, 11s. to 15s.; light, 7s. 3d. to 10s. 6d.

Of fat cattle about 1,900 head were yarded. The cattle generally were of very good quality, there being a high percentage of good to prime bullocks and a number of drafts of prime cows. There was a very large attendance of buyers, including many from the country. One large buyer operated with freedom and secured about 600 head. The sales opened to a good general demand, with prices on a par with the previous week's rates, but the market became irregular as sales progressed, and prices showed a weakening tendency, closing rates showing a distinct decline on those at the opening sales. Prime bullock beef realised 20s., with occasional pens at 22s. per 100 lb., at the opening sales, but closing rates were 18s. to 19s. Cow beef was worth 17s. to 19s., with odd pens to 20s. A small draft of prime bullocks and cows from Cheepie were sold, the bullocks averaging £9 3s., and the cows £6 a head. Quotations:—Prime heavy bullocks to £11 2s. 6d.; prime, £7 to £8; good, £6 to £7; light, £4 10s. to £5 15s.; prime heavy cows to £8 10s.; prime, £4 5s. to £5 5s.; good, £3 to £4; light, £2 to £3; vealers and weaners, 6s. to £2 14s.

Fruit and Vegetables.

ROMA STREET (31st October).—Beans, 3s. to 7s. 6d.; peas, 4s. to 10s. per sugar bag; cabbage, 3s. 6d. to 10s.; pumpkins, 4s. to 8s.; marrows, 2s. to 3s. 6d.; cucumbers, 9d. to 2s. per dozen; smallgoods, 1s. to 2s. a dozen bunches; tomatoes, 3s. 6d. to 8s. per quarter-case; apples, eating 14s. to 16s., cooking 10s. to 15s.; oranges, 10s. to 15s.; mandarins, 5s. to 16s. a case; lemons, 3s. to 4s.; passion fruit, 8s. to 11s. 6d.; papaws, 2s. to 3s. 6d. per quarter-case; bananas, 2d. to 9d. a dozen; pineapples, 2s. 6d. to 8s. a dozen, odd choice lots to 10s.; eggs, guaranteed special, 11d. to 1s. a dozen.

CERTIFICATE OF SOUNDNESS.

A Certificate of Soundness was issued for the underlisted stallion in the courset of the month of October, 1922.

Name of Stallion.	Breed.	Period for which Certificate issued.	Owner's Name.	Owner's Address.
Baron Kilvie	Clydesdale	12 months	J. H. Kilvington	Glenore Grove, Forest Hill

General Notes.

The Pig that Pays.

There is great temptation when times are bad in the special line of farming or stock-raising you have taken up to change over to another line, provided climate and other conditions are suitable; but experience teaches that by far the safest method is to go in for one definite branch as a foundation and to stick to it consistently, however you may vary your side lines. That is the advice of one of the biggest pig-breeders in Illinois, who has seen many ups and downs in the industry, but has always found that, provided the foundation stock are good, the swing back of the pendulum from bad to good seasons will always bring sufficient profit with it and more than counterbalance the lean times. He believes in Poland-Chinas, which also do very well in this country. As he credits his system of feeding with much of his success it may be worth while to briefly summarise it here.

The sows are bred for early spring farrow. As farrowing time approaches they are housed to accustom them to their surroundings, so that they will be quiet and contented when the pigs come. Their ration consists of ground lucerne or soybean hay, with a slop made of boiling water and ground corn. After farrowing, the same ration is continued, with an extra portion of ground lucerne to keep the bowels free. A little ground oats and barley is added to the slop to increase the milk-flow. While the pigs are young the sows are separated from them, and fed and watered on a floor. They also get exercise in this manner. When they return to the pens the pigs suck, the sows are quiet and contented, and there is less likelihood of their stepping on the youngsters than where they are fed amongst their litters. This system also helps to keep the animals and pens clean, and does much to keep the sows in good health.

When the pigs are old enough to eat, they are provided with separate pens and fed a slop made of ground oats or barley, boiled, and served warm. Oats make bone and muscle, while barley is best for fattening. Later the sows and litters are moved to individual houses in the paddocks and allowed to range at will, with such additional feeds as are necessary for the proper nourishment of the sows and the development of the pigs. Pumpkins are fed in the autumn; indeed, this breeder has found pumpkins so good a feed that he has produced a considerable acreage of them for years, purely for that purpose.

Sex Determination—Miracles that did not Work.

A good deal has appeared in poultry papers recently about a device invented by an American which it was claimed could determine the sex of any animal or egg in the embryo stage. Some of the claims made for it, indeed, were so extraordinary that we refrained from even referring to it previously. Now that it has been tested out by the United States Department of Agriculture, and found to be useless, we feel that it is well to warn farmers to whom it may be offered for sale. It is a long, tubular, plummet-shaped device made of nickel-plated iron and filled with a greenish mixture (calcium carbonate and aluminium salt) and suspended by a fine thread. When held an inch above an egg containing a male germ the stuffed tube was said to swing back and forth like the pendulum of a clock; but if the eggs were of the opposite sex the bob would describe little circles; and in the case of an infertile egg there would be no motion at all.

It was also said to tell the sex of oysters, butterflies, caterpillars, beetles, worms, and even the sex of the animal from which were obtained such products as leather and cheese. Even the criminologist was offered assistance, for it was claimed that the unfailing little detective would tell the sex of the person who shed the blood found on clothing or elsewhere. Unfortunately for those who hoped to make a fortune out of its sale the Department's experts could not get the "miracles" to work. Tests on eggs and other things by a number of persons showed that the instrument was useless. No two persons got the same results with the same eggs, and eggs known to be infertile gave positive indications that they would hatch both pullets and cockerels.

"Blackhead" in Turkeys.

On 17th November of last year the writer received a dead six months' old turkey with a note from the owner requesting a post-mortem examination of the carcass, and stating that, out of a flock of fifty turkeys, six were showing symptoms similar to those which had been evidenced by the dead bird. These symptoms were loss of appetite, progressive dullness, lassitude, and emaciation, and diarrhoea of a striking golden yellow colour. The disease had appeared in the various affected birds at intervals during a period of a fortnight previous to the date mentioned, the outbreak apparently originating in one particular turkey which was still alive, though described by the owner as a "hopeless case." The dead bird, however, had shown obvious signs of illness for only two days before death.

"Blackhead" was suspected, and an examination was immediately made of the dead bird, with the following results:—

The carcass was thin, but not emaciated, the weight being $7\frac{1}{2}$ lb. The comb and skin of the head were not darkened, but this is by no means a constant symptom of the disease. In this case the skin of the head was, if anything, paler than normal. There was considerable evidence of the yellow diarrhoea round the vent.

On the carcass being opened, the liver was seen to be enlarged to almost twice the normal size, and to be covered with greenish yellow patches, some circular, many irregular in shape, while others again were ring-like with a centre of normal liver tissue. These areas extended some distance—about $\frac{1}{8}$ in.—into the liver tissue, and their surfaces were depressed below the normal level of the liver substance. The largest area was approximately the size of a sixpence, the smallest being $\frac{1}{8}$ in. in diameter.

Both caeca were much distended throughout their whole length, their walls were $\frac{1}{4}$ in. thick, and they were filled with cheesy, greyish yellow material.

THE TREATMENT.

The disease was thus definitely demonstrated to be "Blackhead," and it was determined, with regard to the remaining birds, to adopt the Ipecacuanha treatment, as recommended by the Wegeforths (*vide* "National Poultry Journal," 9th September, 1921, p. 165).

The ailing turkeys were strictly isolated, and the fluid extract of ipecacuanha was administered in the proportion of ten drops per bird three times daily for three days; then twice daily for three days, and finally, once a day for the same period. The rest of the flock which had been in contact with the diseased birds were given the powdered ipecacuanha in the proportion of one teaspoonful per twenty turkeys twice weekly in mash, to be continued so long as any sign of disease existed on the premises.

Treatment was commenced on 20th November, and continued until the 29th. A week was then allowed to elapse and treatment again renewed.

EXCELLENT RESULTS.

The results were excellent. From the commencement of the treatment the disease appeared to be checked. The birds did not at once improve, but certainly did not get worse. The weight of the turkey in which the disease originally appeared was, on 29th November, barely 7 lb. After the second nine days' treatment, or rather during that period, all the birds began to improve, and on 12th December the weight of the abovementioned turkey—the "hopeless case"—was $9\frac{1}{2}$ lb. By that time all the birds had apparently recovered, appetite and vitality were restored, weight increased, and the droppings were normal in colour and consistency. No signs of the disease had appeared in the rest of the flock.

The owner was unwilling to send the birds to the Christmas market without first making quite certain that all signs of the ravages of the disease in the internal organs had disappeared; so the originally affected turkey was condemned to suffer for the benefit of science, and was chloroformed on 13th December.

Post-mortem examination showed the internal organs to be perfectly healthy—the liver was normal in size and colour, and the caeca and their contents were also normal. The remaining turkeys were thereafter killed for Christmas, and no sign whatever of the disease was found in the internal organs of any of them.

The writer is aware that cases of "Blackhead" occasionally recover spontaneously, but surely it is too much of a coincidence that six turkeys, each of which had shown signs of disease at different times, should simultaneously show a check in the course of the disease at the commencement of the treatment, and continuous improvement thereafter.

It is interesting to note how soon—within a fortnight or so—the liver and caeca of the originally affected turkey, which were presumably somewhat similar in appearance to those of the dead bird first sent in, returned to their normal condition. It is also noteworthy that in none of the sick birds was the skin of the head darkened.

Up to the date there has been no sign of reappearance of the disease. The owner describes the treatment as "a wonderful cure."

The fly in the ointment is the cost. In the present state of the drug market the cost of the nine days' fluid extract treatment works out at approximately 1s. 4d. per bird, and that of the powdered ipecacuanha preventive treatment at 6d. per twenty birds per week. The treatment is therefore somewhat expensive, but in this instance, at any rate, the results fully justified the expense; and it is well to remember that strict isolation of affected birds will assist greatly in reducing the number of those requiring treatment.—N. Bissett, M.R.C.V.S., in "National Poultry Journal."

The Value of Sheep—Small Flocks on Small Areas.

In the course of a recent communication to the Press, Mr. T. A. Spencer, of Roma, who has had many years' experience of grazing in the Maranoa, writes very interestingly on the subject of sheep grazing on small areas, and stresses strongly our neglect in not exploiting to the full the wool possibilities of Queensland. The following points are taken from Mr. Spencer's contribution:—

The most profitable industry of all, and one that has been proved more suitable than any other in this continent, is the wool industry. In this industry we practically have a monopoly, as no other country in the world can compete with us.

The coastal portion can be left to cotton growing, dairying, and fodder crops, but the West is capable of enormous development. The demand for wool is unlimited, high prices are assured for years owing to the shortage of wool. There are 100,000,000 sheep fewer in the world to-day than there were thirty years ago, and 20,000,000 fewer in Australia. Anyone who reads these figures and is familiar with the industry must realise that unless something is done to alter present conditions there will be a further decrease in our numbers.

We find in the West, on the large holdings, owing to the fly pest, large numbers of sheep in big paddocks, and the dingo pest, that the annual losses are enormous. One station lost 40,000 sheep in one year owing to these conditions, and it is being realised that it is almost impracticable to carry large flocks in big paddocks, especially in timbered country where the carrying capacity is light.

Queensland could Treble Her Flocks.

Queensland to-day should be carrying 60,000,000 sheep instead of about 20,000,000. The losses by flies and dingoes are heavy, the losses from drought are heavy, but they can be overcome to some extent. The remedy against flies and dingoes is smaller paddocks and smaller areas. Men can handle small flocks in small areas with a comparatively light loss. The remedy against drought to a large extent is a better water supply. There are not ten stations in Queensland properly supplied with water. Stock have to travel long distances to water; in a drought they are too weak and in good seasons it is not necessary to go back for feed, consequently half the holdings are never utilised. A hundred boring plants should be going continuously either for artesian or subartesian water, or where the country is unsuitable for either, large tanks or dams should be made. What is a living area in one district will not apply to others, as the further west one goes the larger the area necessary. The Maranoa district at present carries about 250,000 sheep; it ought to carry 500,000. Practically the whole of the land in this district is suitable for sheep, but is mostly timbered and badly watered. Very few of the holdings are improved. All valueless timber should be ringbarked.

Some Essentials of Successful Settlement.

A man with 1,500 to 2,000 sheep to-day has a good income, and, compared with farming and dairying, an easy life. It takes very little more to start a small grazing farm with 1,000 sheep than a wheat or dairy farm. The areas in this district close to the railway line should be about 1,200 acres on which a few sheep could be kept, and dairying or mixed farming carried on. As one gets away from the line the areas should be increased from 2,000 up to 10,000 acres, say 70 miles from the line. This land should be cut up as suggested, all valueless timber ringbarked, and provision made for a permanent water supply by artesian and sub-artesian bores or tanks. The interest on the cost could be added to the rent. This would mean the settlement of hundreds of families who could not help being successful, and there would be an enormous increase in the production of wool.

Keep a Few Sheep.

My advice to every man on the land is to keep a few sheep. You may search the records and you will hardly ever see a failure among sheep owners.

Small areas as suggested will stop the spread of pear.

To increase the number of sheep and make this great industry a greater success than it is to-day smaller areas and the above methods must be adopted.

Answers to Correspondents.

Fowl Manure as a Fertiliser.

B.K. (Flying Fish Point, Innisfail)—

The Agricultural Chemist (Mr. Brünnich) advises that fowl manure is only a poor fertiliser, as it contains about $1\frac{1}{2}$ per cent. of nitrogen, $1\frac{1}{2}$ to 2 per cent. of phosphoric acid, and $\frac{3}{4}$ per cent. of potash. The best method of treating it is to allow it to rot in a pit, mixing it with litter or any other refuse. Fresh manure applied in the large amounts necessary is liable to encourage breeding of worms and insects. In well-rotted manure this risk is greatly reduced. Saltpetre would be a very expensive remedy, and its value for destroying worms and insects is doubtful.

Sorghum halepense.

J. WILSON-GREEN, Wavertree, Oakey.

The Government Botanist (Mr. C. T. White, F.L.S.), advises:—

The specimens represent the underground stems of the Johnson Grass (*Sorghum halepense*), a plant closely resembling Soudan Grass but differing in its perennial habit and underground fleshy stems (rhizomes). It is a useful fodder grass of which stock are very fond either green or as hay. It, however, can become a great pest in cultivation, almost any small piece of the underground white fleshy stem being capable of producing fresh plants. Like others of the *Sorghum* family (including Soudan Grass) it produces at times a prussic acid yielding glucoside and when eaten heavily by stock at those times may cause trouble and sometimes death.

The Grass Tree.

W. S. (Toowoomba)—

We have no special Bulletin dealing with this plant, but the following information supplied by Mr. C. T. White, F.L.S., Government Botanist, may be of interest to you.

Uses.—The resin or "gum" has long been an article of export and is used chiefly in the manufacture of cheap furniture polishes or wood stains, and lacquer for metal ware, also in the manufacture of linoleum. Picric acid, one of the most widely used of modern war explosives, is also obtainable from it, but it has probably little importance as a raw material in this direction. Experiments with the core as a source of alcohol, and the core and leaves of paper pulp, do not indicate much probability of commercial success.

Method of Collection.—J. H. Maiden in his "Useful Plants of Australia" gives the following as the usual method of collecting the gum in New South Wales. "The stems of the grass trees are hacked down, broken into convenient pieces, and allowed to fall into a sheet. A stout stick or flail commences the work of disintegration. The substance is then passed through a sieve, the ligneous portions of the grass tree for the most part failing to pass through its meshes. A gentle breeze is sufficient to winnow what has passed through the sieve, in order to render it ready for market; but it usually comes to Sydney having been subjected to no winnowing purpose.

Market.—There are several buyers. I think the people best for you to communicate with would be, Messrs. McGlew and Co., 138-140 Creek street, Brisbane, Messrs. Burns, Philp, and Co., Mary street, Brisbane, M. Finucan, Market street, Brisbane, and Wilfred Picken, Union Bank Chambers, Brisbane. The price is somewhere about £16 per ton. The principal seat of the industry in Australia is at Kangaroo Island, South Australia, where a particularly large species of grass tree occurs. The Department of Chemistry, Adelaide, South Australia, has issued a special booklet dealing with the grass tree gum and its method of extraction, and if you wrote to the Director he might be able to supply you with a copy. The price would be nominal.

Farm and Garden Notes for December.

Although November is regarded generally as the best period for planting the main maize crop, on account of the tasselling period harmonising later on with the summer rains, December planting may be carried out in districts where early frosts are not prevalent, provided a known quick maturing variety of maize is sown.

To ensure a supply of late autumn and winter feed, dairymen are advised to make successive sowings of maize and sorghums, to be ultimately used either as green feed or in the form of silage. The necessity for such provision cannot be too strongly urged. Farmers who have not had any experience in building an ensilage stack can rest assured that, if they produce a crop for this purpose, information and instruction on the matter will be given on application to the Under Secretary for Agriculture and Stock; also that, whenever possible, the services of an instructor will be made available for carrying out a demonstration in ensilage-making for the benefit of the farmer concerned and his immediate neighbours.

In districts and localities where supplies of lucerne are not available, sowings of cowpeas should be made, particularly by dairymen, as the lack of protein-yielding foods for milch cows is a common cause of diminished milk supplies and of unthriftiness of animals in dairy herds. Cowpeas and lucerne can be depended upon to supply the deficiency. The former crop is hardy and drought-resistant. When plants are to be used as fodder, it is customary to commence to feed them to stock when the pods have formed. Animals are not fond of cowpeas in a fresh, green state, consequently the plants should be cut a day or two before use. Economy is effected by chaffing beforehand, but the plants can also be fed whole. Chaffed in the manner indicated, and fed in conjunction with green maize, or sorghum when in head, in the proportion of one-third of the former to two-thirds of the latter, a well balanced ration is obtainable. Animals with access to grass land will consume from 40 to 50 lb. per head per day; a good increase in the milk flow is promoted by this succulent diet. The plant has other excellent attributes as a soil renovator. Pig-raisers will find it invaluable also.

A great variety of quick-growing catch crops, suitable for green fodder and ensilage purposes, may also be sown this month, notably Sudan grass, white panicum, giant panicum (liberty millet), Japanese millet, red and white French millet. Well prepared land, however, is required for crops of this description, which make their growth within a very limited period of time. French millet is particularly valuable as a birdseed crop, the white variety being more in favour for this purpose.

Successive sowings may be made of pumpkins, melons, and plants of this description.

In districts where onions are grown, these will now be ready for harvesting. If attention is given, in the case of garden plots, to bending over the tops of the onions, maturity of the crop is hastened. Evidence will be shown of the natural ripening-off process, and steps should be taken to lift the bulbs and to place them in windrows until the tops are dry enough to twist off. If a ready market is not available, and it is decided to hold over the onions for a time, special care should be taken in handling. Storage in racks in a cool barn is necessary, otherwise considerable deterioration is to be expected. Improved prices are to be looked for in marketing by grading and classifying produce of this description.

Cotton areas which were subjected to a thorough initial preparation, thereby conserving a sufficiency of moisture for the young plants, should now be making good headway and sending their taproots well down. Keep down all weed growth by scarifying as long as the growth will admit of horse work.

KITCHEN GARDEN.—Gather cucumbers, melons, vegetable marrows, and French beans as soon as they are fit for use. Even if they are not required, still they should be gathered, otherwise the plants will leave off bearing. Seeds of all these may be sown for a succession. Tomatoes should be in full bearing, and the plants should be securely trained on trellises or stakes. Where there is an unlimited supply of water, and where shade can be provided, lettuce and other salad plants may still be sown. All vacant ground should be well manured and dug two spits deep. Manure and dig as the crops come off, and the land will be ready for use after the first shower.

FLOWER GARDEN.—Keep the surface of the land well stirred. Do not always stir to the same depth, otherwise you are liable to form a "hard pan," or caked surface beneath the loose soil. Alternate light with deep hoeings. A few annuals may still be planted, such as balsams, calendulas, cosmos, coreopsis, marigold, nasturtium, portulaca, zinnia, and cockscomb. Plant out whatever amaranthus may be ready. These may still be sown in boxes. Clear away all annuals which have done flowering. Bulbs should have all the dead leaves cut away, but the green leaves should not be touched. Stake chrysanthemums, and, as the flower buds develop, give them weak liquid manure. Coleus may now be planted and propagated from cuttings. Dahlias are in various stages, but the greater part will have been planted by this time. Give them liquid manure, and never let them dry up. Lift narcissus about the end of the year, but do not store them. Plant them out at once in their new positions. Top-dress all lawns.

Orchard Notes for December.

THE COASTAL DISTRICTS.

The planting of pineapples and bananas can be continued, taking care that the ground is properly prepared and suckers carefully selected, as advised previously in these Notes. Keep the plantations well worked and free from weed of all kinds, especially if the season is dry. New plantations require constant attention, in order to give young plants every chance to get a good start; if checked when young they take a long time to pull up and the fruiting period is considerably retarded. Small areas well worked are more profitable than large areas indifferently looked after, as the fruit they produce is of very much better quality. This is a very important matter in the case of both of these fruits, as with the great increase in the area under crop there is not likely to be a profitable market for inferior fruit. Cannery only want first-class pines of a size that will fill a can, and cannot utilise small or inferior fruit, except in very limited quantities, and even then at a very low price. Small, badly filled bananas are always hard to quit, and with a well-supplied market they become unsaleable. Pineapple-growers, especially those who have a quantity of the Ripley Queen variety, are warned that the sending of very immature fruit to the Southern markets is most unwise, as there is no surer way of spoiling the market for the main crop. Immature pineapples are not fit for human consumption, and should be condemned by the health authorities of the States to which they are sent.

Citrus orchards require constant attention; the land must be kept well worked and all weed growth destroyed. Spraying or cyaniding for scale insects should be carried out where necessary. Spraying with fungicides should be done where the trees show the need of it. A close lookout must be kept for the first indications of "maori," and as soon as it is discovered the trees should either be dusted with dry sulphur or sprayed with the lime-sulphur, potassium, or sodium sulphide washes. Borers should be looked for and destroyed whenever seen.

Early grapes will be ready for cutting. Handle carefully, and get them on to the market in the best possible condition. A bunch with the bloom on and every berry perfect will always look and sell well, even on a full market, when crushed and ill-packed lines are hard to quit.

Peaches, plums, papaws, and melons will be in season during the month. See that they are properly handled. Look out for fruit fly in all early ripening stone fruit, and see that none is left to lie under the trees to rot and thus breed a big crop of flies to destroy the mango crop when it ripens.

Keep leaf-eating insects of all kinds in check by spraying the plants on which they feed with arsenate of lead.

Look out for Irish blight in potatoes and tomatoes, and mildew on melons and kindred plants. Use Bordeaux or Burgundy mixture for the former, and finely ground sulphur or a sulphide spray for the latter.

THE GRANITE BELT, SOUTHERN AND CENTRAL TABLELANDS.

Early ripening apples, plums, apricots, peaches, and nectarines will be ready for marketing during the month. They are unsatisfactory lines to handle, as the old saw, "Early ripe, early rotten," applies to all of them; in fact, the season of any particular variety is so short that it must be marketed and consumed as quickly as possible. All early ripening deciduous fruits are poor carriers and bad keepers, as their flesh is soft and watery, deficient in firmness and sugar, and cannot, therefore, be sent to any distant market. The available markets are quickly over-supplied with this class of fruit, and a glut takes place in consequence. Merchants frequently make the serious mistake of trying to hold such fruits, in the hope of the market improving, with the result that, instead of improving, the market frequently becomes more and more congested, and held-over lines have to be sent to the tip. There is only one way to deal with this class of fruit, and that is to clear the markets daily, no matter what the price, and get it distributed and into consumption as rapidly as possible by means of barrowmen and hawkers. Most early ripening fruits are useless for preserving in any way, their only value being what they will bring for consumption whilst fresh. This being so, it is only a waste of time and money to forward immature, undersized, and inferior fruit to market, as it is not wanted and there is no sale for it. It should never have been grown, as it is frequently only an expense to the producer, besides which, unless the fallen or over-ripe fruit is regularly and systematically gathered and destroyed in the orchard, it becomes a breeding ground for fruit fly and codling moth, as well as of fungi, such as those producing the brown and ripe rots. Early ripening fruits should, therefore, be carefully graded for size and quality, handled, and packed with great care, and nothing but choice fruit sent to market. If this is done, a good price will be secured, but if the whole crop—good, bad, and indifferent—is rushed on to the local markets, a serious congestion is bound to take place and large quantities will go to waste. It is better to get a good price for half the crop and destroy the balance than to rush the whole on to the market and get little or nothing for it.

Orchards and vineyards must be kept in a state of perfect tilth, especially if the weather is dry, so as to retain the moisture necessary for the development of the later ripening fruits. Where citrus fruits are grown, an irrigation should be given during the month if water is available for this purpose, excepting, of course, there is a good fall of rain sufficient to provide an ample supply of moisture.

Codlin moth and fruit fly must receive constant attention and be kept under control, otherwise the later-ripening fruits are likely to suffer severely from the depredations of these serious pests.

Grape vines must be carefully attended to and sprayed where necessary for black spot or downy mildew, or sulphured for oidium. Where brown rot makes its appearance, spraying with the potassium or sodium sulphide washes should be carried out. Leaf-eating insects of all kinds can be kept in check by spraying with arsenate of lead.

Vegetables will require constant attention in the Granite Belt area. Tomatoes and potatoes will require to be carefully watched in order to prevent loss from Irish blight, and no time should be lost in spraying these crops should this disease make its appearance in any part of the district, as it can be prevented by spraying with either Bordeaux or Burgundy mixture. These fungicides effectually protect the plants to which they are applied if used in time. If leaf-eating insects, such as beetles, grasshoppers, and caterpillars, are doing damage as well, add 3 or 4 lb. of arsenate of lead to the 100 gall. if spraying mixture used for the prevention of early and late blight (potato macrosporium and Irish blight), so that the one application will be effectual for both classes of diseases.

Keep all kinds of vegetables well worked, stirring the land frequently to retain moisture, and taking care to prevent the formation of a surface crust should rain take place. Remember that vegetables require plenty of moisture; therefore leave nothing to chance, but do your best to retain all the moisture in the soil you possibly can.

RAINFALL IN THE AGRICULTURAL DISTRICTS.

TABLE SHOWING THE AVERAGE RAINFALL FOR THE MONTH OF SEPTEMBER IN THE AGRICULTURAL DISTRICTS, TOGETHER WITH TOTAL RAINFALLS DURING SEPTEMBER 1922 AND 1921 FOR COMPARISON.

Divisions and Stations.	AVERAGE RAINFALL.		TOTAL RAINFALL.		Divisions and Stations.	AVERAGE RAINFALL.		TOTAL RAINFALL.	
	Sept.	No. of Years' Records.	Sept., 1922.	Sept., 1921.		Sept.	No. of Years' Records.	Sept., 1922.	Sept., 1921.
<i>North Coast.</i>					<i>South Coast—continued:</i>				
	In.		In.	In.		In.		In.	In.
Atherton	9·63	21	0·03	1·58	Nambour	2·53	26	3·08	3·71
Cairns	1·72	40	0·44	3·85	Nanango	1·96	40	1·06	1·66
Cardwell	1·48	50	0·10	3·09	Rockhampton ...	1·33	35	0·57	2·08
Cooktown	0·59	46	0·17	0·95	Woodford	2·21	35	2·93	4·32
Herberton	0·49	35	0·12	0·89					
Ingham	1·28	30	1·75	5·19					
Innisfail	3·69	41	2·13	8·80					
Mossman	1·22	14	0·45	2·37					
Townsville	0·80	51	0·22	1·76					
<i>Central Coast.</i>					<i>Darling Downs.</i>				
Ayr	1·56	35	0·04	1·32	Dalby	1·79	52	0·68	1·25
Bowen	0·84	51	0·25	1·07	Emu Vale	1·94	26	0·35	2·82
Charters Towers ...	0·81	40	0·09	1·31	Jimbour	1·63	34	0·60	0·63
Mackay	1·64	51	1·58	9·07	Miles	1·48	37	0·56	1·22
Proserpine	2·40	19	0·30	9·44	Stanthorpe	2·48	49	1·62	2·77
St. Lawrence	1·35	51	0·73	2·26	Toowoomba	2·26	50	1·89	3·04
					Warwick	1·90	57	1·84	1·84
<i>South Coast.</i>					<i>Maranoa.</i>				
Biggenden	1·74	23	0·45	2·22	Roma	1·59	48	0·04	0·64
Bundaberg	1·80	39	0·52	0·35					
Brisbane	2·10	71	3·35	2·02					
Childers	2·01	27	0·45	1·34					
Crohamhurst	2·71	30	3·28	5·28					
Esk	2·33	35	2·20	1·66					
Gayndah	1·59	51	0·72	0·87					
Gympie	2·18	52	1·83	3·17					
Glasshouse Mts. ...	2·29	14	2·93	5·03					
Kilkivan	1·74	43	2·12	1·77					
Maryborough	1·99	51	1·10	2·49					
					<i>State Farms, &c.</i>				
					Bungeworgorai ...	1·46	8	0·04	0·58
					Gatton College ...	1·77	23	0·96	1·85
					Gindie	1·07	23	0·52	4·64
					Hermitage	1·72	16	1·66	2·28
					Kairi	0·75	8	0·06	0·49
					Sugar Experiment Station, Mackay	1·58	25	1·45	7·66
					Warren	0·83	8	...	1·40

NOTE.—The averages have been compiled from official data during the periods indicated; but the totals for September this year, and for the same period of 1921, having been compiled from telegraphic reports, are subject to revision.

GEORGE G. BOND,
State Meteorologist.

ASTRONOMICAL DATA FOR QUEENSLAND.

TIMES COMPUTED BY D. EGLINTON, F.R.A.S.

TIMES OF SUNRISE AND SUNSET.

AT WARWICK.

1922.	OCTOBER.		NOVEMBER.		DECEMBER.	
Date.	Rises.	Sets.	Rises.	Sets.	Rises.	Sets.
1	5.34	5.50	5.4	6.8	4.50	6.32
2	5.33	5.51	5.3	6.9	4.50	6.33
3	5.32	5.52	5.3	6.9	4.50	6.34
4	5.31	5.52	5.2	6.10	4.50	6.35
5	5.29	5.53	5.1	6.11	4.50	6.36
6	5.28	5.53	5.0	6.12	4.51	6.36
7	5.27	5.54	5.0	6.12	4.51	6.37
8	5.25	5.54	4.59	6.13	4.51	6.38
9	5.24	5.55	4.59	6.14	4.51	6.38
10	5.23	5.55	4.58	6.15	4.51	6.39
11	5.22	5.56	4.57	6.16	4.52	6.39
12	5.21	5.56	4.57	6.16	4.52	6.40
13	5.20	5.57	4.56	6.17	4.52	6.40
14	5.19	5.57	4.56	6.18	4.52	6.41
15	5.18	5.58	4.55	6.19	4.53	6.41
16	5.17	5.59	4.55	6.20	4.53	6.42
17	5.16	5.59	4.54	6.20	4.53	6.43
18	5.15	6.0	4.54	6.21	4.54	6.44
19	5.14	6.0	4.53	6.22	4.54	6.45
20	5.13	6.1	4.53	6.23	4.55	6.45
21	5.12	6.2	4.53	6.24	4.55	6.46
22	5.11	6.2	4.52	6.24	4.56	6.46
23	5.10	6.3	4.52	6.25	4.56	6.46
24	5.9	6.3	4.51	6.26	4.57	6.47
25	5.8	6.4	4.51	6.27	4.57	6.47
26	5.8	6.5	4.51	6.28	4.58	6.47
27	5.7	6.6	4.50	6.28	4.59	6.48
28	5.6	6.6	4.50	6.29	5.0	6.48
29	5.5	6.7	4.50	6.30	5.0	6.49
30	5.5	6.7	4.50	6.31	5.1	6.49
31	5.4	6.8	...	...	5.1	6.49

PHASES OF THE MOON, OCCULTATIONS, &c

The times stated are for Queensland, New South Wales, Victoria, and Tasmania when "Summer" Time is not used.

6 Oct. ○ Full Moon 10 58 a.m.

14 " ☾ Last Quarter 7 55 a.m.

20 " ● New Moon 11 40 p.m.

27 " ☾ First Quarter 11 26 p.m.

Apogee on 5th at 6 a.m.

Perigee on 20th at 2.42 a.m.

An occultation of Delta Tauri will take place on 10th October about a quarter past 9. With binoculars or a small telescope this will be an interesting sight as the Moon will be in the group of stars called the Hyades of which Aldebaran is the principal star.

5 Nov. ○ Full Moon 4 36 a.m.

12 " ☾ Last Quarter 5 52 p.m.

19 " ● New Moon 10 6 a.m.

26 " ☾ First Quarter 6 15 p.m.

Perigee on the 17th at 10.6 a.m.

Apogee on the 29th at 5.24 a.m.

Delta Tauri will again be occulted about 3 a.m. on the 7th; also Eta Virginis on the 15th about 9.30 p.m.; and the planet Saturn on the 16th about 5 p.m. when the Moon and it are far below the horizon.

4 Dec. ○ Full Moon 9 24 p.m.

12 " ☾ Last Quarter 2 41 a.m.

18 " ● New Moon 10 20 p.m.

26 " ☾ First Quarter 3 53 p.m.

Perigee on 15th at 1.30 a.m.

Apogee on 27th at 2.6 a.m.

Delta Tauri will be occulted about 10 a.m. on the 4th, when the Moon and star are below the horizon, but on the 31st, when it will be occulted about the time of sunset, an interesting observation of the star's reappearance may be possible in the twilight.

For places west of Warwick and nearly in the same latitude, 28 degrees 12 minutes S., add 4 minutes for each degree of longitude. For example, at Inglewood, add 4 minutes to the times given above for Warwick; at Goondiwindi, add 8 minutes; at St. George, 14 minutes; at Cunnamulla, 25 minutes; at Thargomindah, 33 minutes; and at Oontoo, 43 minutes.

The moonlight nights for each month can best be ascertained by noticing the dates when the moon will be in the first quarter, and when full. In the latter case the moon will rise somewhat about the time the sun sets, and the moonlight then extends all through the night; when at the first quarter the moon rises somewhere about six hours before the sun sets, and it is moonlight only till about midnight. After full moon it will be later each evening before it rises, and when in the last quarter it will not generally rise till after midnight.

It must be remembered that the times referred to are only roughly approximate, as the relative positions of the sun and moon vary considerably.

[All the particulars on this page were computed for this Journal, and should not be reproduced without acknowledgment.]

Queensland

Department of Agriculture and Stock

Volume XVIII



DECEMBER, 1922

Queensland Agricultural Journal



REGISTERED AT THE GENERAL POST OFFICE, BRISBANE,
FOR TRANSMISSION BY POST AS A NEWSPAPER.

Edited by
J. F. F. REID

INSURE WITH YOUR OWN OFFICE
THE STATE GOVERNMENT INSURANCE OFFICE

MOST FAVOURABLE TERMS

**FIRE, LIFE,
MARINE,**

**ALL FUNDS
INVESTED WITHIN
THE
STATE.**



**& ACCIDENT
INSURANCE.**

**AGENCIES IN ALL
TOWNS THROUGHOUT
THE
STATE.**

**HEAD OFFICE,
GEORGE AND ELIZABETH STREETS, BRISBANE.**

**BRANCHES AT WARWICK, IPSWICH, TOOWOOMBA,
BUNDABERG, ROMA, ROCKHAMPTON, MARYBOROUGH,
MOUNT MORGAN, TOWNSVILLE, AND CAIRNS. . . .**

**JOHN A. WATSON,
COMMISSIONER.**

TAYLOR'S SEED MAIZE

OUR New Season's Stocks of Seed Maize are now ready.
 We have all the leading varieties, including Yellow Horse-
 tooth, Yellow Dent, Ninety Day, White Hickory King, Golden
 King, etc. Each of these are beautiful samples, specially selected
 for seed purposes, all topped and tailed, and thoroughly reliable.

IF INTERESTED, WRITE US !

For present planting we can offer you—

**JAPANESE MILLET, WHITE PANICUM, Ordinary
PANICUM, GIANT PANICUM, PASPALUM, RHODES
GRASS, SACCALINE, IMPHEE, WHITE DUTCH
CLOVER, COUCH GRASS, etc.**

SUDAN GRASS.—One of the most valuable summer-growing
 fodder crops for grazing purposes. Fine stocks on hand of first-
 class germinating seed. Try a small quantity for yourself, and you
 will prove its worth,

**VEGETABLE and
FLOWER SEEDS of
every description for
the farm and garden.**

CHAS. TAYLOR & CO.
*"The
Leading
Seedsman,"*
**110-116 ROMA STREET,
BRISBANE.**

VOL. XVIII., PART 6.]

[DECEMBER, 1922.

Registered at the General Post Office for Transmission by Post as a Newspaper.]



THE
QUEENSLAND AGRICULTURAL JOURNAL,

ISSUED BY DIRECTION OF

THE HON. THE SECRETARY FOR AGRICULTURE.

EDITED BY J. F. F. REID.

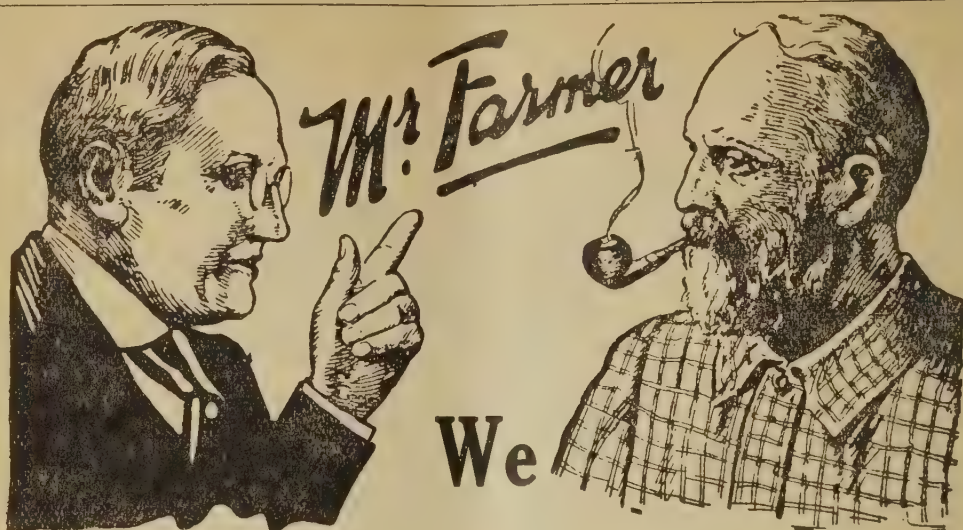
VOL. XVIII. PART 6.

DECEMBER.

By Authority:

ANTHONY JAMES CUMMING, GOVERNMENT PRINTER, BRISBANE.

1922.



MAKE every sort of **BAG** *You* require, of the **Best Quality**,
and at a **Fair Price**.

We also stock sound, reliable second-hand ones.

Give Us a Trial

Joyce Bros. (Q.) Limited
Stanley Street, South Brisbane

As an Idea

Consider—Judge and—Act

THE PUBLIC CURATOR—

1. Is the People's Executor and Trustee;
2. Has Trust Moneys to lend to assist Queenslanders to build or acquire homes;
3. Makes Wills free on application;
4. Prepares and registers real property transfers, Leases, Mortgages, Powers of Attorney and other legal documents, without the cost of Brisbane Agents;
5. Collects Book Debts for Business Firms;
6. Acts for Absentees as Attorney or Agent in the management of Businesses or Estates;
7. Attests legal documents as a Notary Public or Commissioner for Affidavits of The Supreme Courts of all the States and of the Dominion of New Zealand and The High Court of Australia.

Write for Pamphlet to the Public Curator, Brisbane, or to the Local Deputy Public Curator at Townsville and Rockhampton.

CONTENTS.

	Page.		Page.
Organisation of the Agricultural Industry—Monthly Record of Progress and Achievement	383	Production, Prospects, and Prices—	
New Staff Appointments	385	Weather and Crops	416
Fruit Fly Investigations	387	The Markets	416
Sugar: Field Reports	389	General Notes—	
Cane Pest Combat and Control	392	An Effective Rat Poison	417
Queensland Trees (C. T. White, F.L.S., and W. D. Francis)	394	Arrowroot Pool Board	417
Weeds of Queensland (C. T. White)	398	Wheat Pool Board	417
The Dairy Herd, Queensland Agricultural College, Gatton	399	Meat Industry Advisory Board	417
Report on Egg-laying Competition, Queensland Agricultural College, October, 1922	400	Development of Cotton Growing—Appointment of Director of Cotton Culture	417
Home Tanning—II.	402	Answers to Correspondents—	
Rainfall in the Agricultural Districts	409	Trees Suitable for Planting in the Bell District	418
Factors in an Ideal Ration (J. McLean Wilson)	410	The Use of Lime in the Stanthorpe District	418
Event and Comment—		"Fish Poison Vine" (Derris Uliginosa)	419
Cotton Pests—Occurrence on the Downs	414	Dividing Fences	420
The Study of Agriculture	414	The Cultivation of Newly-Cleared Land	420
Overcrowded Professions and an Undermanned Industry	414	Disease among Fowls	421
A Field Opportunity	415	To Correspondents	421
Ratoon Cotton	415	Farm and Garden Notes for January	422
		Orchard Notes for January	423
		Astronomical Data for Queensland	426
		Departmental Announcements	XIII.

Queenton Seeds We Grow

Early Jewel and Ponderosa Tomato, Sugar Melon,
Giant Rock Melon, Iceberg Lettuce, Giant Rhubarb,
White Spine Cucumber, Rosella, Crested Cosmos,
Giant and Striped Zinnia, Double and Single
Dianthus, Phlox, Calendula, Sweet Peas, etc.

All 6d. per packet

SEED LIST ON APPLICATION

E. MANN & SON

Seed Growers

- Charters Towers

Quality Presentation Ware.

SUGGESTING INTERESTING
GIFTS FOR THE EARLY
GIFT GIVER—

FOR LADIES

HANDKERCHIEFS

Ladies' Handsomely Embroidered Handkerchiefs, pure Lawn, artistically displayed in boxes containing half dozens.

Price..... **5/6 to 14/6**

Ladies Pure Linen Handkerchiefs, Embroidered, exquisitely designed in beautiful boxes containing half dozens.

Price..... **15/6 to 57/6**

DRESSING CASES.

Ladies' Dressing Cases, folding model, elaborately fitted with superior quality fittings, embracing all Toilet requirements, constructed of smooth Tan Cowhide, and nicely finished throughout. **50/-**

Also Superior Quality **75/- and 147/-**

HAND BAGS.

Ladies' Beautiful Silk Beaded Bags, magnificently hand worked, made of superior quality Silk, of wondrous lustre, beaded in Jet, mounted Mock Ivory Frames, Silk Foulard lining..... **84/-**

FOR GENTLEMEN

HANDKERCHIEFS

Gent's Handkerchiefs, medium size, Pure Linen, hemstitched. **From 29/- to 57/6 dozen.**—A practical Gift for Gentlemen.

NECKWEAR.

Gent's Pure Silk Knitted Neckwear, fine sheen, in coarse or fine knit, in Black **7/6 to 32/6** and Coloured Stripe effects.

DRESSING CASES.

Gent's Dressing Case, folding model, constructed of best English Cow-hide, fitted with finest quality Toilet Helps, and when folded is small and compact **65/-**

Also superior quality **86/- and 100/-**

Select your Gift from the "House of Handsome Gifts"

MENTION DESK "A.J."

Pike Brothers

LIMITED

Townsville

BRISBANE

Toowoomba

See pages
88-89
of Catalog
for fitted
Leather
Ware

—If it is not
here, peruse
our Catalog
(Series 10)
Particularly
pages 70-75

QUEENSLAND AGRICULTURAL JOURNAL

VOL. XVIII.

DECEMBER, 1922.

PART 6.

ORGANISATION OF THE AGRICULTURAL INDUSTRY.

The Queensland Producers' Association.

Monthly Record of Progress and Achievement.

The last Regular Monthly Meeting of the Council of Agriculture was held in the Council Room, Teachers' Training College Building, Turbot street, Brisbane, on Thursday, 16th November. Subjoined is a Record of Proceedings covering many matters of first importance to the Farming Industry.

Attendance.

The Hon. W. N. Gillies (President), Messrs. J. Purcell (Vice-President), E. Graham, T. Flood Plunkett, J. T. Tod, W. Purcell, H. Keefer, J. E. Dean, F. M. Ruskin, H. I. H. Ross, W. Ranger, S. J. Howe, F. J. Morgan, T. Muir, R. Swan, C. V. Hives, W. G. Batchler, C. H. Pritchard, W. Short, and the Director (Mr. L. R. Macgregor).

DAIRYING COMMITTEE.

Metropolitan Milk Supply.

The Dairying Standing Committee recommended that the scheme submitted by the Metropolitan Milk Producers' Association in connection with the milk supply of the metropolis, be referred back for further investigation by the Committee.

Herd Improvements.

A letter from the Millaa Millaa Producers' Association, suggesting that bulls from the State Farm be leased for periods to farmers, was referred to the Director of Dairying (Mr. E. Graham) for his consideration, with a request that he furnish a report to the next meeting of the Committee. He was further requested to submit suggestions regarding the rules of Herd Book Societies in order that the matter may be taken up with the Breeders' Association.

Hamilton Cold Stores.

In connection with the control of the cold storage works at Hamilton, the President (Hon. W. N. Gillies) said that the Cold Stores were being built to meet the needs of the dairying industry, and for some time would be used exclusively for that purpose. Roma Street Cold Stores would be used for fruit. It was decided that control should be vested in the Department of Agriculture.

ADMINISTRATIVE COMMITTEE.

Regulations, Primary Producers' Organization Act.

A clause in the Draft Regulations under the Primary Producers' Organisation Act was amended to read:—

“That each District Council, upon formation, shall elect to the Council a representative who is a member of a Local Producers' Association, or, who, in the opinion of the Council, is a person directly representing producers.”

A further amendment provided for the conduct of the elections of District Councils by postal ballot from Head Office.

Secretaryship.

Approximately 140 applications were received for the position of Secretary and Accountant, and from these a selection of four was submitted by the Administrative Committee for consideration by the Council. It was decided that the Council interview each of these applicants at its next meeting.

Advertising Primary Products.

A scheme outlined by the Director for advertising primary products received the approval of the Council. With a view to stimulating public interest in the State's primary products, and to induce increased consumption, it is proposed to have successive window displays of various agricultural products, and to devote the first show, as from the beginning of December, to cheese. The display will be staged in the window of Kodak Ltd., Queen street. It will take the form of cheese exhibits, with pictures illustrating the various processes of manufacture and data showing production and the value of cheese to the State. Prepared dishes, showing how readily cheese may be used as an article of diet, together with attractive recipes and comparative tables figuring the nutritive value of cheese in relation to other forms of food, will be a feature of the exhibit.

Membership of the Association.

The Supervisor of District Agents reported that to date 533 Local Producers' Associations have been formed, with a total membership of 10,742, and the work is proceeding satisfactorily.

FRUIT COMMITTEE.

Selling Agents' Charges.

The Council noted that the Crown Solicitor is of the opinion that the Commissioner of Prices has the necessary power to fix the commission charges by agents in the sales of fruit in the Brisbane markets, and decided that in the circumstances he be requested to investigate the rates of commission being charged by agents with a view to bringing about a reduction in the rates at present ruling.

Elementary Chemistry.

A communication from the Department of Agriculture to the effect that a new edition of the Agricultural Chemist's (Mr. J. C. Brünnich) book “Elementary Lessons on the Chemistry of the Farm, Dairy, and Household” is about to be issued was noted with satisfaction.

The Summer Pineapple Crop.

Arising out of a communication received from the S.Q.F.S. Ltd., on the subject of the marketing of the forthcoming crop of pineapples, that Society was advised that action had already been taken by the Federal Fruit Council with the object of inducing Great Britain to give preference to Australian canned fruits and jams, and that arrangements had been made by that Council to advertise primary products. Further, that the question of exhibiting Queensland preserved fruits and other suitable products at the forthcoming Imperial Exhibition would be further considered at the December meeting of the Committee.

WHEAT COMMITTEE.

Maize Storage.

The Director submitted a scheme for the handling and storage of maize, in the Cairns Hinterland, which the Council considered, and decided to recommend to the Government the advisability of securing the services of an engineering expert to report upon the practicability of giving effect to the suggestion of the Director.

Tariff on Maize.

In connection with a letter received from the Wooroolin Local Producers' Association on the subject of the importation of maize from South Africa, the Committee advised the Association of the action already taken by the Council with the object of inducing the Federal authorities to impose a tariff duty of 3s. 6d. per cental on the maize in question.

General.

In the matter of the supply and distribution of bags to Local Producers' Associations, the Committee recommended that the Director consult with the Wheat Board.

The matter of one board to deal with marsupials and rabbits was listed for further consideration by the Committee at its next meeting.

The action taken by the Victorian Farmers' Union to bring to fruition the stabilisation proposals was noted with satisfaction.

The Department of Agriculture advised the Committee that draft plans of model dairy buildings were now in the hands of the printer.

A letter from the Hunterton Local Producers' Association urging the Council to establish Central Selling Agencies was referred to the Director.

NEW STAFF APPOINTMENTS.

Messrs. W. G. Wells, Cotton Expert, and J. M. Ward, Chief Instructor in Fruit Culture, were appointed recently to the professional staff of the Brisbane Office of the Department of Agriculture and Stock.

After qualifying in other fields, Mr. Wells entered the service of the United States Department of Agriculture at the Cotton Experiment Station, San Antonio, Texas, the largest cotton producing State in the Union. Mr. Wells first devoted his attention to plant breeding, and became the field man in charge of cotton breeding stations, doing field and demonstration work for his department in Texas, California, and Arizona. In 1920 he resigned his U.S. Federal appointment to join the professional staff of the S.W. Cotton Co., a subsidiary concern of the Goodyear Tyre Corporation. At the time of his engagement by the Queensland Government Mr. Wells was managing a cotton ranch for the Goodyear people. Mr. Wells is now travelling through the Queensland cotton areas for the purpose of making himself familiar with local conditions.

Mr. J. M. Ward was Fruit Expert for the Tasmanian Government, and his work and career are well known to the orchardists of this State. Mr. Ward has had a wide experience in practical fruit culture, and in organising and administrative work connected with the industry. Prior to joining the Tasmanian Department as assistant fruit expert, in May, 1914, he was engaged in orcharding at Glenorchy, and was one of the largest and most successful apricot growers in the Island State. He delivered lectures in practically every fruitgrowing district in Tasmania on many occasions, and for three years conducted winter horticultural classes at Launceston. Mr. Ward was one of the prime movers in organising growers on co-operative lines. In 1918 he visited the western States of America and Canada on behalf of the Tasmanian Government, and studied the latest methods of organisation, co-operation, and standardisation of fruit, and the treatment of pests. He gained much valuable knowledge, and on return placed it at the disposal of growers. At the invitation of the Victorian fruit growers, he lectured at their annual meeting, and this year he lectured in Adelaide before the Australian Fruitgrowers' Conference. Recently, at the invitation of the Queensland Government, he delivered a series of lectures extending over fourteen days through the citrus and deciduous fruitgrowing districts of this State. He has represented the Tasmanian Government at different conferences in the majority of the mainland States. Mr. Ward on two occasions visited Brisbane in charge of a Tasmanian exhibit of apples.



PLATE 89.—THE MINISTER FOR AGRICULTURE, HON. W. N. GILLIES, AND THE FIELD AND GENERAL STAFF OF THE BRISBANE OFFICE,
DEPARTMENT OF AGRICULTURE AND STOCK.

FRUIT FLY INVESTIGATIONS.

The Minister for Agriculture and Stock (Hon. W. N. Gillies) has made available the following report of the Entomologist in charge of Fruit Fly Investigations at Stanthorpe, Mr. Hubert Jarvis, for the month of October, 1922.

A TOOWOOMBA QUEST.

A visit was made on 11th October to Toowoomba in order to ascertain at this time of the year the presence or otherwise of the Fruit Fly (*Chaetodacus tryoni*) in that district, in any one or more of its phases.

Whilst pursuing this inquiry in company with Mr. W. Leslie, Instructor in Fruit Culture, visits of inspection were made to the following orchards and gardens:—J. McGovern, Middle Ridge; F. Scott, Bellevue street; Miss Fletcher, Dudley street, Range; T. Cardingly, Rangeville; W. Hutchison, Range; J. H. Hartman, Range; G. Dunster (Nurseryman), Toowoomba; E. Postle, Harristown; and F. Swift, Harristown.

In the Soil.

Search was made for the pupa of the fruit fly under the following trees:—Orange (Valencia late), lemon, custard apple, cherry plum, persimmon, apple (var. Lord Nelson), cherry guava, plum, quince, peach (late), loquat, and walnut. No living pupæ were, however, met with in these situations.

In Fruit.

The following fruits were examined for fruit fly larvæ:—Orange, lemon, and loquat.

In the citrus fruits no larvæ (maggots) were discovered; but in almost every case loquats examined were found to contain fruit fly maggots in different stages of growth. Many of these maggots have subsequently given rise to the mature fruit fly—*Chaetodacus tryoni*.

The loquat is a much grown fruit in Toowoomba, particularly the variety of it ripe at this time of the year; numerous gardens are scattered throughout the district, each supporting at least one loquat tree, in some cases two or three.

This fruit is, I understand, of little commercial importance. Ripening, as it does, just prior to the maturing of the citrus fruits, it certainly constitutes a serious source of fruit fly infestation to these later fruits, more especially so as in many cases loquat trees are growing close to and even amidst the orangeries. These features connected with the loquat and loquat growing would almost warrant the destruction of this tree, or at least a systematic destruction of its fruit, prior to its ripening.

Walnut.

Mr. T. Hutcheson (Range) informed me that last season the walnuts on his trees, and on those of his neighbour also, harboured the maggots of some fly, which he presumed were those of a fruit fly, being similar in appearance and size to the maggots of the Queensland fruit fly.

These maggots, however, were probably those of some other fly and were first observed and recorded by Mr. H. Tryon, Government Entomologist and Vegetable Pathologist, in 1889 (*vide* Report on Insect and Fungus Pests of the Toowoomba District).

Wintering of Fruit Fly.

Although the soil under such late fruits as custard apple, quince, and late apple was carefully examined (*i.e.*, put through a 1/16-inch mesh sieve) for fruit fly pupæ, failure to find any would seem to indicate the non-wintering in the soil, of the fruit fly in the Toowoomba district. This, however, is a subject for further inquiry.

Some of the oldest residents at Toowoomba affirm that the loquat trees are fruiting there almost continuously throughout the year. It would be interesting to ascertain if loquats, ripening (should they do so) in very late autumn, or very early spring (about August), contain fruit fly maggots.

I am indebted to Mr. W. Leslie, Instructor in Fruit Culture, stationed at Toowoomba, for much help and assistance.

WARWICK INVESTIGATION.

A visit was also made on 30th October to Warwick, where a similar inquiry to the foregoing was carried out, and with somewhat similar results.

The only ripe fruit in Warwick gardens at the time of the year mentioned was the loquat, and in this fruit fruit fly maggots were discovered identical with those found in loquat fruit in Toowoomba. In Warwick, however, the loquat is quite a scarce tree, and thus considerable difficulty was experienced in locating the four trees met with.

TRAPPING FRUIT FLY EXPERIMENTS.

Glass fly traps containing various so-called fruit fly lures, and placed in various parts of the district, have, throughout the month, failed to attract one individual even of the Queensland Fruit Fly (*Chaetodacus tryoni*) nor have any examples of this species been observed at blossom.

FRUIT FLY MAGGOTS IN IMPORTED FRUIT.

On 18th October Instructor J. Henderson submitted specimens of late Valencia oranges harbouring fruit fly maggots; these oranges were sent in the course of trade from Brisbane. From twelve of them, 130 fruit fly maggots were reared to the pupa stage in the laboratory, one female fruit fly (*Chaetodacus tryoni*) having so far emerged to date. The careful and thorough inspection following this event now being carried out, of all fruit imported into the Granite Belt, should prove a control measure of much importance.* The possible injury to this district, through the distribution of even one or two cases of infested oranges (should such escape inspection) cannot be over-estimated; this amount being, in fact, very much more than sufficient to distribute the fruit fly throughout the entire area. Any recipient of fruit—either by rail or post—on finding this to contain maggots, should immediately destroy it either by fire or by burying it at least 2 feet underground.

I consider this watchfulness and care, more especially at this time of the year, of the utmost importance, in keeping the district free of fruit fly, and were this care and watchfulness consistently carried out by every individual, it would, it seems, not only materially help to control the pest, but would also undoubtedly retard its advent to this district. Much, however, has yet to be learnt in relation to the habits and life history of the fruit fly (*Chaetodacus tryoni*), the distance it can fly, its longevity, native host-fruits, &c.

Presuming, as is stated by some entomologists, that the fruit fly cannot fly far (i.e., about $1\frac{1}{2}$ miles), the importance of closing every avenue of mechanical introduction by the systematic inspection before alluded to, or by exclusion (if deemed necessary) with respect to certain fruits during the spring months, finds in this fact especial justification.

OTHER INJURIOUS INSECTS.

Peach Aphis.

Although not this season so widely distributed throughout the district as in some previous years, yet the Black Aphis of the peach has done, and is still doing, a considerable amount of damage in certain districts. Control experiments have been started with the injector (kindly loaned to the office by Mr. W. F. Barnard), the chemical used being carbon bi-sulphide. Several trees were so treated at Eukey, and not only there for Black Aphis of stone fruit, but also for the Woolly Aphis of the apple. It is hoped to continue experiments in this direction in other localities also, and results as obtained will be reported monthly. On 10th October the Black Aphis was found plentifully on the fibrous roots of peach trees at Applethorpe. No winged forms were observed in this situation, but adult viviparous wingless females and immature forms also were abundant, all underground at a depth of about 12 inches. Should this insect winter on the roots of the peach and plum trees as is very probable, control measures with the injector in late winter might prove of benefit.

Aphis sp.

On 10th October my attention was drawn to an Aphis visitation at Applethorpe. This Aphis, that at present is specifically undetermined, visited the above district and simultaneously (as I have since ascertained) the entire Granite Belt. Although in vast numbers and settling on cultivated plants of a great many varieties, this insect appeared to do little harm and, moreover, by the end of the month had practically disappeared.⁹ It was observed on the following trees and naturalised herbaceous plants:—Apple, plum, pear, nectarine, oat, milk thistle, pigweed, turnip, and bean (broad and French varieties). I learn from the testimony of various orchardists—old residents in the district—that the visit of this Aphis is a yearly one, and that it has not been found to ever materially damage fruit trees. In my own garden, however, I observed that both "Broad" and French beans were, as the outcome of infestation by it, retarded in growth.

* Mr. Henry Tryon, Entomologist in Chief, Department of Agriculture.

FUNGUS DISEASES.

Several specimens manifesting disease of fungus or other origin were during the month submitted to this Office, and forwarded to the Government Entomologist and Pathologist (Mr. H. Tryon) for identification of the parasitic agent operating.

FIELD WORK.

Visits of inspection have been made during the month to the following districts:—Bald Mountain, Eukey, The Summit, Beverley, Glen Aplin, Applethorpe, Warwick, and Toowoomba.

SUGAR: FIELD REPORTS.

The Northern Field Assistant, Mr. E. H. Osborn, reports under date 9th October, 1922, as follows:—

Babinda.

This area was inspected early in the month and found to be suffering from the same dry conditions that were in force further south. The registered rainfall to 30th September amounted to 162.01 inches, against 328.1 inches for the same period during 1921. Of this fall 3.66 inches fell in July, 1.52 inches in August, and 2.45 inches during September.

Very cold weather had also been experienced during the spring and winter months, and consequently the cane had made poor growth and the total amount to be harvested will be considerably below the early estimates.

These weather conditions are also responsible for the backward state of the recently cut ratoons, and to a slighter extent the young plant cane.

Generally speaking, the strike of plant cane has been a very good one and at time of visit it was very green and healthy looking, though somewhat backward. In nearly all cases it was very clean and showed that full advantage had been taken of the dry weather to carry out thorough cultivation. The mill is doing very good work, averaging well over 5,000 tons per week, and the cane supply is very regular. The density figures were also very good, as the average density for the 5,445 tons crushed in the week ended 30th September was 15.4 c.c.s., whilst the tons of cane to ton of sugar worked out at 6.7 tons. These figures in the Babinda area are very good. The large amount of land recently stumped and ploughed was most noticeable.

Tractors.—Tractors have become popular in this area, no fewer than four of different types having been landed here since last June.

New Varieties of Canes.—Quite a number of the local growers have planted out canes from the South Johnstone Experiment Station, the principal varieties being Tableland Badila, E.K. 1, E.K. 28, Q. 903, H. 146, H.Q. 409, H.Q. 458, &c., and in most cases these germinated well.

Freshwater.

This area was visited early in the month and despite the dry weather the general appearance of the crops was most encouraging. Some very heavy crops have been harvested and most of the recently cut cane has ratooned very well; some splendid young plant cane was also seen. Badila is the only cane grown at Freshwater, and it certainly responds well on the rich and deep alluvial flats.

Hambledon.

A very large area of land has been planted and replanted lately in the above area, and in most cases the strike has been very fair. Quite a large area of the land ploughed out has been grub-affected, and in most of these places where Badila has been grown D. 1135 is now being planted. Upon several of the farms small plots had been planted out with some of the newer varieties obtained from South Johnstone Experiment Station, and generally speaking they looked very fair.

Most of the paddocks of young plant cane looked very clean and free from weeds, and all that was wanted was a good downpour of rain to help the growth along.

Mulgrave Mill Areas.

Crushing was in full swing in this large area and the mill was doing exceptionally good work, the general mill work and the quantity of sugar turned out easily beating all former records.

No time had been lost in the mill or field by labour troubles, and everything was working in a very satisfactory manner. Regarding the cane being harvested, the dry conditions have reduced the previous tonnage estimates considerably, and at time of visit the mill expected to finish crushing early in December. In visiting the farms it was most noticeable that those that had been kept in a high state of cultivation were standing up to the dry conditions far more than the others. Generally speaking, the standard of cultivation in this area is high; had it not been so the crops now being cut would have been much lighter.

A large quantity of manure (mixed) is annually used in the area, also green manuring and liming. Another manure that is used here is crushed filter press cake which is bagged and supplied to the growers by the mill management. All through the area large blocks of land have been worked up and planted for next season, and in most cases a good strike had been the result. Rain was wanted urgently. Recently cut ratoons were very backward in growth. Badila, H.Q. 426, Goru, and D.1135 are easily most in favour, while Malagache was seen in one or two places. Some very fair crops of D.1135 were harvested. This variety did not cut as well as was expected of it earlier in the season, although it kept its growth fairly well during such a dry period.

Quite a large area has been planted out, especially in the grub-affected areas, and the strike has been uniformly good. While in the area a visit was made to the locality known as "the Little Mulgrave." This area is, roughly, speaking, some 5 miles from the end of the permanent tramline at Riverstone, and at present a couple of miles of temporary rails are joined on to this, leaving some 3 miles to be served with rails from this point.

The interested growers talk of finding the requisite rails and thus open up some first-class country for next year. Some of the growers consider that they can find (approximately) some 800 to 1,000 acres of really good cane land within a couple of miles of this proposed railhead. The land itself is mostly rich pockets of deep light alluvial soil, suitable for growing very heavy crops of cane. Some remarkably good Badila, going probably from 45 to 50 tons to the acre, was being cut upon Mr. C. Ross's farm; the recently cut ratoons from same, although, so far, unworked, looked very well.

Several fine paddocks of young plant cane were also noticed in this locality; in fact, the general appearance of the cane being cut and also the young cane coming on was extremely good.

It is satisfactory to note that the use of tractors is increasing rapidly in this area. While visiting the district a consignment of three was made to a local agent.

Pests.—A good deal of loss was caused by grubs, bats, and borers during the year. A number of old and experienced growers state that the rat pest upon some of the farms adjacent to the river or creeks has been greater than in any former years, and from personal observation joined to a good knowledge of the district I believe such is the case. Grubs and borers also did a good deal of damage, and on top of this the lengthy spell of very dry weather during the past few months helped to account for the 20,000 tons of cane that the mill management expect to be short by the end of the crushing season. At time of my visit rain was urgently required to help the recently cut ratoons and also the young plant cane along. So far the latter looks remarkably green and healthy and is very free from weeds. A few light showers of rain were experienced about the 23rd and 24th, which will do a great deal of good, but much more is required to be of any lasting benefit. Without such the outlook for next season is not too promising.

The Southern Field Assistant (Mr. J. C. Murray) reports under date 23rd November, 1922.

Mackay.

In the immediate environs of Mackay the cane cut with moderate tonnage had good c.e.s. value. The Racecourse Mill, which takes most of this cane, had a good run, and has finished crushing. The haulage facilities in this area are not up to date, the farmers having to cart their cane by means of horse teams, which mutilate the roads and cause much loss of good time. Notwithstanding this drawback the area is progressing in the direction of good farming, and there is an atmosphere of considerable apparent prosperity.

Varieties which gave good returns in this locality for this season are Q.813, with an approximate average of 16 c.e.s.; M.1900 seedling, density 17 c.e.s.; Malagache, 14 c.e.s.; M.189, 17 c.e.s.; Badila, 17 c.e.s.; and Q.970, 16 c.e.s. The cutting this year has been very fair, although an occasional grower has been taking off too

much top. Tops tested taken from Q.813 analysed 11.4 c.c.s., and it is probable, judging by the cane cut off, and taking the density of the top as a basis, that growers cutting too severely were losing about £3 per acre.

The borer is inflicting a little damage on the cane this year in this locality, although not sufficiently to cause the farmer much anxiety. M.1900 Seedling appears to have been attacked more than other varieties, and the effect is slightly noticeable in the purity tests. Mr. Keogh, the chemist in charge at Mackay Sugar Experiment Station, noticed that in unbored 1900 Seedling the purity was 96.4, while bored cane of the same variety stood at 94.2. However, the incidence of cane damaged by borer is so slight as not to cause the farmer any misgivings. This area is also fairly free from the depredations of the cane grub.

Mirani.

The cane on this section of the Pioneer, as far as Pleystowe, has not cut heavily, but the sugar-content has been high. The crops are coming on for next season, and look very well indeed, although rain is badly needed. Much of the young ratoon cane looks particularly well, especially that which was not cut too early in the season. Such canes particularly are M.1900 Seedling and H.Q.426. The farmers in this area are now undoubtedly doing good farming. This is probably due to two reasons—a better financial position and an increased knowledge of their soil and its requirements. More lime is wanted on these soils, and a still greater use of crops calculated to strengthen the humus supply. Fertilising with highly concentrated fertilisers should be undertaken most carefully, and it is to be pointed out to the farmers that much valuable information can be obtained within the community by carefully watching each other's fertilising efforts on typical soils.

A small amount of leaf disease is in evidence in the cane in this locality. The only effective method of contest in this respect is careful plant selection. In the case of gumming, of which a little is also apparent, the field should be given as long a rest as possible and a resistant variety to gum such as Q.813 or the early maturing variety H.Q.285 planted. However, the injurious effects of these diseases are very slight in this district at present.

Finch Hatton.

The cane on the fertile flats in the vicinity of Finch Hatton probably cut heavier tonnages than elsewhere in the Mackay district. The mill had a very fair run, and the c.c.s. value of the cane was uniformly high. On the higher lands of Finch Hatton the soil is not so rich, and wants deep cultivation and green manuring. It is probable, regarding fertilisation, that on a soil of this description meatworks manures would be most effective, taking as a basis known results on soils that are fairly typical in colour and texture to these.

Cane varieties doing well in this district are D.1135, Q.813, H.Q.426, Cheribon, and M.1100 Seedling.

Farmers are strongly advised not to use the plough in young plant cane, for the reason that at a critical state of the plant's life the young roots are damaged, and growth is also retarded by the inverting of soil particles and a consequent disturbance of the fermentation and chemical processes that are going on in the soil at this critical period. Cultivating ratoon interspaces and young plant cane interspaces are entirely different processes.

The growers in the Finch Hatton district are handicapped by primitive haulage arrangements, much of the cane having to be carted by teams several miles. This applies particularly to the farmers on the north side of the river. There is a big area of cane land in this fertile district still uncultivated. However, with the increase of settlement and the assurance of a living price for cane this land will in time, no doubt, be farmed.

Plane Creek.

Crops here are fair, with the usually high density that the farmers obtain. Young plant and ratoon crops are making good growth, although more rain is badly needed. During the last few years farmers in this district have greatly increased their areas on account of the encouragement given by recently prevailing prices.

Cane varieties looking well at present are H.Q.285, Q.813, H.Q.426, M.1900, and D.1135. These are all favourite varieties here. The growers are recommended to try E.K.I., as well, this cane having excellent standover properties. The mill at Sarina has this year reached a high standard of efficiency, and the crushing went through almost without interruption. An excellent labour-saving device recently installed by the management is a big switcher. It is interesting to note the speed and facility with which the operator does his work during the bagging process.

Homebush.

The young crops, plant and ratoon, look well here, and the cutting season is progressing without interruption. The Rosella Siding presents a busy appearance just now, with its electric lighting plant, loading crane, and gangs of workmen all going at high pressure. Rain is wanted on the Homebush areas, although the cane can still go on without rain for some time yet without receiving a noticeable check.

The growers are doing good cultivation generally, but more vegetable manures are wanted on their soils. The soil here is a light forest loam for the most part, and meatworks fertilisers would probably be most beneficial.

Farleigh Areas.

In common with the other Mackay districts the tonnage on the farms within the influence of the Farleigh Mill has not been great this season, but the sugar-content of the cane has been high. Cane varieties that have given the farmers good returns are M.1900 Seedling, Q.970, Q.1121, Q.855, H.109, D.1135, Cheribon, and Uba. The lastnamed cane is, however, being displaced. Cane diseases, as far as could be observed, are not much in evidence, although in the case of old varieties still growing, but not as staple canes, gumming and "striped leaf disease" are apparent. Farmers are advised that as soon as they definitely decide a cane is of no use for their particular conditions, to get rid of it altogether and not allow inoculated stocks to grow on the outskirts of the farm, and in the farm garden. Neglect increases their susceptibility, and these canes become a menace to the healthy ones.

Methods of cultivation are uniformly good, although subsoiling would improve the drought-resisting properties of the soil, as well as better drainage and the more free advent of soil air. Green manure crops are recommended, as well as local experiment plots as a basis for more extensive fertilisation. Growers are also recommended to submit more samples of soil than they are doing to the Bureau for chemical analysis. While this latter process is by no means conclusive, it forms an excellent basis for local experiment.

CANE PEST COMBAT AND CONTROL.

The Entomologist, Sugar Experiment Stations (Mr. Edmund Jarvis), reports under date 24th November, 1922, as follows:—

Experiment Plots at Meringa.

The cane on these plots was cut during the second week in August, and the crop went about 18 tons to the acre, the c.e.s. being 8.14.

On the plot treated with naphthalene (150 lb. per acre) the cane sticks were straighter, and about 6 inches longer than those on the adjoining check plots. The application of chloride of lime, tobacco dust, and coal-tar gave negative results; the stools on these plots being practically the same height as those on controls alongside.

Where the soil had been sprayed with an emulsion of carbolineum and soap (carbolineum 2½ pints, soap 3 lb., water 25 galls.) the cane was noticeably higher than anywhere else. Fifty per cent. of the sticks on this plot were standing, and about 10 per cent. of those on the adjoining check plot.

Owing to the crop as a whole having escaped serious damage from grubs, the results of our experiments with these surface deterrents were rendered inconclusive, although data of more or less economic value was obtained.

Injury from Moth-Borer.

Serious infestation by the Large Moth-Borer (*Phragmatiphila truncata*, Walk.) was noticed this season (August to October) among mature crops of Badila and D.1135 growing on lowlying ground near Aloomba. The caterpillars were found mostly near the top of the canes, and also occurred freely in central and basal portions.

From reports lately to hand, this most-pest appears to have been very much in evidence during the present season, both at Meringa and Gordonvale; owing probably to climatic conditions having proved unfavourable to the activities of its various parasitic enemies.

The chief natural controlling factor of *truncata* in the Cairns district is a tiny *Braconid* wasp (*Apanteles nonagriæ*, Oliff) the life-cycle of which was studied

at our laboratory last December (see "Queensland Agricultural Journal, vol. xvii., p. 81), when it was found that its various stages (from egg to wasp) occupy a period of from 15 to 21 days.

This parasite was bred by Oliff in 1893, from caterpillars destroying cane in New South Wales; who, when reporting at that time, stated:—"After careful observation I have convinced myself that one of the chief, if not the chief, reasons that *Nonagria* (*Phragmatiphila*) has not spread more widely and done more damage on the Clarence is the fact that two minute and highly interesting parasites are present in such numbers as to keep it within reasonable limits. The most abundant of these parasites is *Apanteles nonagriæ*." The other parasite alluded to by Oliff is a chalcid wasp (*Euplectus howardi*, Oliff) which up to the present has not, to my knowledge, been found in Queensland. Several broods of *Apanteles* were reared by us last year for liberation at Ayr and Rita Island, on the Lower Burdekin; and we hope to continue this work next month, with a view to distributing these parasites on various selections in the Cairns district.

Fumigating Cane-Beetles.

Excavations made in canefields at Meringa and Highleigh early in September revealed the fact that grey-back beetles had emerged from the pupae, and were awaiting an opportunity to leave the soil.

Carbon bisulphide was injected at a depth of nine inches, immediately under the lines of stools, in twelve different places, the amounts given varying from two to eight drachms. When examined 24 hours later, 17 dead and 13 living beetles were found; all the live specimens, however, being located at distances exceeding nine inches from the actual spots of injection.

Notes on Para-Dichlorobenzene.

Since reporting on the possibilities of this fumigant in connection with cane-grub control, a letter has been received by the writer from the manufacturers in Germany, stating that for many years the firm of Fritz Schult, of Leipzig, have had the exclusive sale of the preparation in question, which they have lately put upon the market under the trade name of "Globol." At the present time it is largely used in wool-mills, magazines, and storehouses all over the world. "Globol" can be supplied by them in quantities of not less than 100 lb. at the rate of 1s. 3d. per lb., this price, however, being subject to fluctuation.

It would take 134 lb. of para-dichlorobenzene (costing at least £8 sterling) to treat an acre of cane with $\frac{1}{4}$ -oz. injections on one side only of rows of cane standing five feet apart.

We may, of course, find as a result of field experiments to be carried out shortly, that $\frac{1}{4}$ -oz. doses injected eighteen inches apart may prove effective, which would materially reduce the cost.

Victor Leggo and Co., of Melbourne, Victoria, who were hoping to be able to manufacture para-dichlorobenzene, have written to me (under date 5th October) stating:—"After making inquiries in England as to the price at which this compound could be delivered in Australia, we find that we could not possibly make it at a price which would be competitive. We have, therefore, abandoned the idea of making it."

✓ When last reporting on the merits of this compound as a fumigant for cane-grubs ("Australian Sugar Journal," vol. xiv., p. 341) we stated that sets of *Badila* planted immediately over injections made in open ground at the laboratory had rooted in the contaminated soil, and the growth above ground at that date appeared normal. Subsequent development of these sets, however, did not prove satisfactory, and accordingly further tests were carried out during September and October with cane sets having single buds, which were planted both in pots and in the open.

As a crucial test a number of tins of soil, about $3\frac{1}{2}$ inches square by 5 inches deep, were treated with $\frac{1}{2}$ -oz. injections placed immediately below small sets two inches long each having a single bud.

As might have been expected, the gas confined in this way had an injurious effect, owing probably to the fumes entering the cut ends of the sets. The eyes in some of the tins produced plants about 3 inches in height, which then stopped growing, owing to non-development of roots. It is worth noting that a cow-pea seed, which had not of course received any mechanical injury, germinated in one of these treated pots, producing a small plant which at present appears to be developing in a normal manner.

In an experiment started 16th October twelve stools of cane about 30 inches high were given $\frac{1}{2}$ -oz. injections placed just under the sets, and when examined after an interval of 24 days both the treated and control plants had noticeably increased in size.

Another experiment is being conducted in which the doses are placed from 4 to 6 inches from the stools, and on a level with or slightly below sets. This method, as already pointed out, admits of simple application, and we know that the fumes will penetrate the soil sufficiently to destroy the grubs.

With regard to future extensive field experiments with this chemical, the points we intend studying will relate (as mentioned in my annual report for 1921-22) chiefly to its effect on young growing cane roots and newly planted sets; while the influence exercised by heavy rain, temperature, closely packed volcanic soils, clay lands, &c., on the rate of evaporation and penetration of para-dichlorobenzene will also, doubtless, furnish data of economic interest.

Tachinid Parasite of Weevil-Borer.

The work of breeding fly parasites for future liberation on borer-infested plantations has been continued from month to month; this activity of our Experiment Station being second only in importance to research work in connection with cane-grub control.

During August last Mr. Cottrell Dormer, Assistant Entomologist, let go sixty tachinid flies at South Johnstone, and later (27th October) liberated eighty-four at Macknade, where arrangements have been made by us to collaborate with the mill manager, Mr. West, in this useful work. The Colonial Sugar Refining Company have always been keenly alive to the great economic importance of this fly-parasite (*Ceromasia sphenophori*, Vill.) as a natural controlling factor of the Beetle Borer. In 1913 they introduced it into Fiji, and being satisfied with results obtained there, sent an assistant entomologist to Queensland last year to establish a cage for breeding these flies at Macknade Mill. In view of the extensive area under sugar-cane in the Herbert River district, it was, as already mentioned, considered advisable that our Sugar Bureau should unite forces with the company, in order that parasites might be liberated at many different centres, and losses due to the borer be reduced throughout the cane area with as little delay as possible.

Goondi was visited this month (October), when on the 20th instant 26 parasites were given their liberty on Mr. Davis' farm at Daragee, the block retained by Mr. Davis for breeding the flies being well infested with borers.

Introduction of Digger-Wasp Parasites.

A third breeding-cage for rearing scoliid wasp-parasites, and additional numbers of tachinid flies, is just finished, and has a capacity of about 450 cubic feet. The Digger-wasps, which we hope to receive from Java about the beginning of January next, will be bred and ultimately liberated from this cage in canefields at Meringa and Gordonvale, where it is expected they will attack the grubs of our grey-back cockchafer. Details of this fascinating phase of grub control will be duly reported from month to month, after arrival of the first consignment of cocoons containing these parasitic wasps.

QUEENSLAND TREES.

By C. T. WHITE F.L.S., Government Botanist, and W. D. FRANCIS, Assistant Botanist.

No. 16.

RED CARABEEN.

The Red Carabeen (*Weinmannia Benthami*) is a very common tree in the scrubs of the mountain ranges of Southern Queensland, such as the MacPherson Range. It is especially common on Robert's Plateau. In New South Wales it is found as far south as the Manning River. The tree is a large one, attaining a height of 120 feet and a barrel diameter of 3 feet. The barrel is often flanged at the base. The bark is grey, sometimes slightly wrinkled and marked by small warts. When cut it is seen to be deep red or brown in colour, but paler towards sapwood. It measures about $\frac{1}{2}$ -inch thick on a tree with a barrel diameter of 2 feet 6 inches. Up to the present the timber does not appear to be extensively used. It should be useful for general indoor work, such as fittings and cabinet-making.



Photo, by the Authors.]

PLATE 90.—RED CARABEEN (*Weinmannia benthami*).

A tree in the Ranges eastward of Emu Vale, Killarney District.

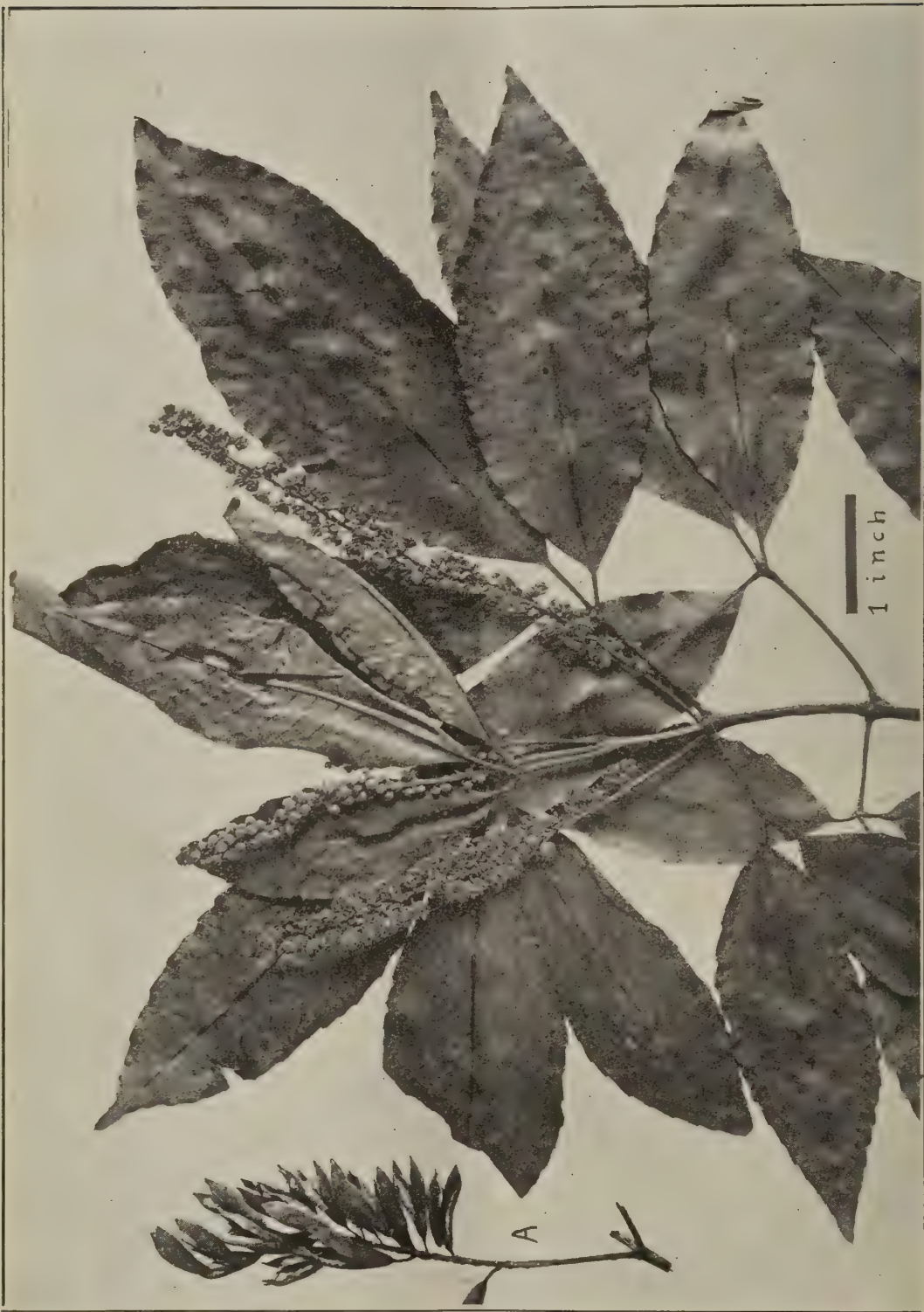


PLATE 91.—RED CARABEEN.
Showing leaves, flowers, and capsules (A).

Photo by Dept. Agriculture and Stock.]



PLATE 92.—AN UNUSUAL RATION. MRS. HUGH McMARTIN, OF PULLEN VALE, INDOOROPILLY, FEEDING DORSET HORN LAMBS ON KUDZU LEAVES AND SWEET POTATOES.

WEEDS OF QUEENSLAND.

By C. T. WHITE, Government Botanist.

No. 28.

THE JO JO WEED (*Soliva sessilis*)—A NEW LAWN PEST.

Description.—A small annual plant 1—4 inches in height bearing a profusion of burrs. Stems and leaves covered with rather long white hairs. Leaves about $\frac{1}{2}$ —1 inch long, the upper half finely divided, the lower half consisting of a long slender stalk. Flower-heads consisting of about 15—20 flowers, sessile in the leaf axils, $\frac{1}{4}$ inch across, surrounded at the base by 7—8 hairy bracts. Achenes ("seeds")

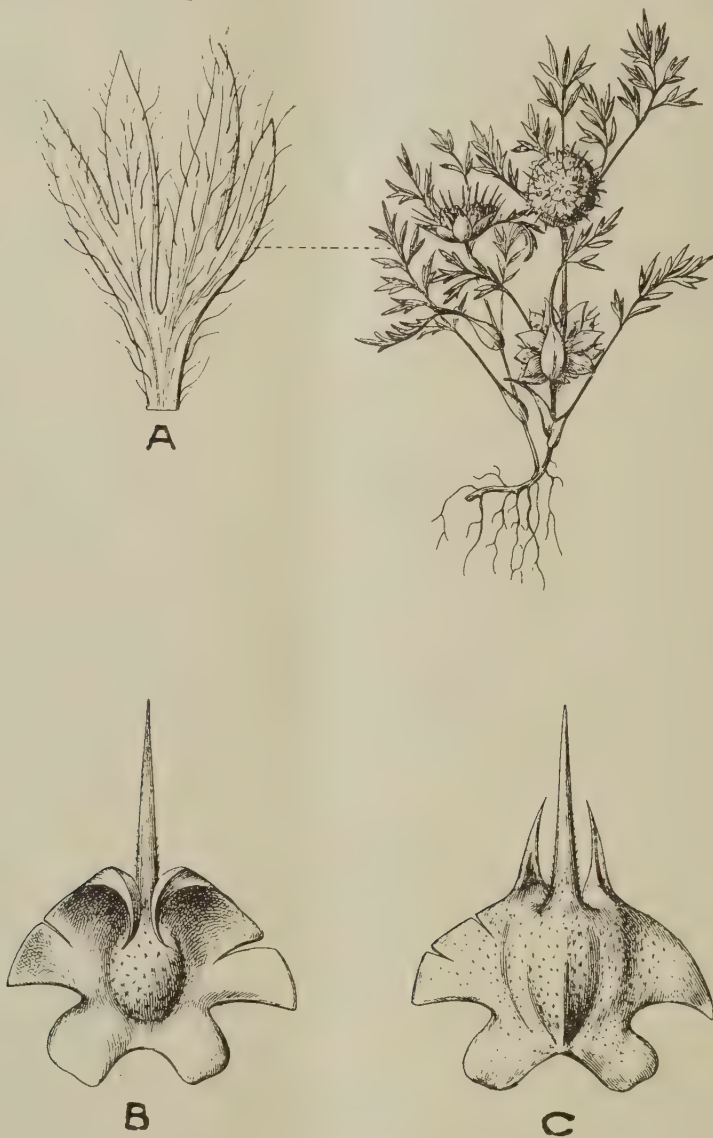


PLATE 93.—JO JO WEED (*Soliva sessilis*).

A, Leaf enlarged; B, Front view, and C, Back view of achene or "seed" much enlarged.

(After J. G. Baker in Martius' "Flora Brasiliensis.")

1 line long, tipped by a sharp, strong spine 1 line long, each "seed" winged at the sides and each wing terminating in an incurved tooth.

Each flower head consists of 7—9 male flowers and 9—12 females; each of these latter is capable of forming a spiny "seed" or achene, with the consequence that the flower head develops into a seed-head—a burr of 9—12 sharp spiny "seeds."

Distribution.—A native of Chili, South America. According to Mr. J. H. Maiden ("Agricultural Gazette" of N.S.W. XXVIII, 183) it first made its

appearance in Australia at the Cricket Ground, Moore Park, Sydney, 1899, and soon became so bad that patrons could no longer sit on the grass with comfort through it.

Specimens were brought to me last year by Mr. J. E. Young, of Graceville, Brisbane, who said that the plant was becoming a pest in that suburb, and this year the plant has made its appearance in several places about Brisbane. It seems to have a preference for lawns and short grass and is one of the worst lawn pests that has so far made its appearance in Queensland.

Botanical Name.—*Soliva*, named in honour of Salvator Soliva, a Spanish physician and botanist; *sessilis*, from the Latin referring to the closely sessile flower heads of "burrs."

Common Name.—"Jo Jo Weed," according to Mr. Maiden, is a local name in use in New South Wales.

Eradication.—Grass is more resistant to sprays than herbaceous plants as a general rule, and the Agricultural Chemist (Mr. J. C. Brünnich) recommends an application of a solution of common salt ($\frac{1}{4}$ lb. to a gallon of water); if it is found to be too severe on the grass a good soaking of water should be given later to leach some of the salt away. Mr. Maiden states that in New South Wales it has been found that Buffalo Grass (*Stenotaphrum*) makes too heavy and coarse a mat for the weed to penetrate, with the consequence that there is no trouble with this weed in Buffalo Grass lawns.

Botanical Reference.—*Soliva sessilis*, Ruiz et pav.. Prodr. peruv 113 t. 24 et Syst. 215.

THE DAIRY HERD, QUEENSLAND AGRICULTURAL COLLEGE, GATTON.

MILKING RECORDS FOR OCTOBER, 1922.

Name of Cow.	Breed.	Date of Calving.	Total Milk.	Test.	Commercial Butter.	Remarks.
			lb.	%	lb.	
Bellona	Ayrshire ...	30 Aug., 1922	990	3.8	43.80	
Pretty Maid of Haremar	" ...	11 Sept., "	900	4.1	43.20	
College Meadow Sweet	Friesian ...	18 Sept., "	900	3.0	31.20	
Confidence ...	Ayrshire ...	13 Aug., "	690	3.8	30.90	
Magnet's Leda ...	Jersey ...	8 Feb., "	544	4.5	30.60	
Hedges Nattie ...	Friesian ...	20 May, "	660	3.9	30.00	
Yarraview Snowdrop	Guernsey ...	1 Sept., "	540	4.6	29.10	
College Cold Iron	Jersey ...	25 Jan., "	406	5.4	27.55	
Miss Betty ...	" ...	17 May, "	450	4.9	25.80	
Thyra of Myrtleview	Ayrshire ...	22 Aug., "	690	3.2	25.50	
Songstress ...	" ...	4 July, "	570	3.8	25.50	
Dawn of Warragarra	Jersey ...	17 May, "	510	4.3	25.50	
Snowflake ...	Shorthorn...	20 Feb., "	570	3.8	25.50	
College Cobalt ...	Jersey ...	3 April, "	450	4.8	25.20	
Hedges Dutchmaid	Friesian ...	23 Sept., "	690	3.0	24.00	
Wattle Blossom ...	Guernsey ...	8 Sept., "	480	4.3	24.00	
College La Cigale	Jersey ...	10 July, "	420	4.5	22.20	
Fair Lassie ...	Ayrshire ...	1 Sept., "	570	3.3	21.90	
Dear Lassie ...	" ...	19 June, "	540	3.5	21.90	
La Hurette Hope	Jersey ...	30 June, "	420	4.4	21.60	
College St. Margaret	" ...	16 June, "	360	5.0	21.00	
Prim ...	Friesian ...	6 Feb., "	544	3.3	20.74	
Miss Fearless ...	Ayrshire ...	30 May, "	540	3.2	20.10	
Netherton Belle ...	" ...	19 July, "	450	3.8	20.10	
College Ma Petite	Jersey ...	5 Feb., "	390	4.4	20.10	

Rainfall for the Month, 166 points.

REPORT ON EGG-LAYING COMPETITION, QUEENSLAND AGRICULTURAL COLLEGE, OCTOBER, 1922.

The report by the principal (Mr. Cuthbert Potts) on the egg-laying competition of the Queensland Agricultural College at Gatton for October, states:—Extremely hot winds were experienced during the month, and these considerably upset the laying of some of the heavy breeds and made them resort to the broody coops. In the light section the highest scores for the month were:—N. A. Singer, 168; C. H. Singer, 166; and R. Gill, 158 eggs. In the heavy breeds, R. Burns came first with 158; C. C. Dennis 140 next, followed by E. F. Dennis with 136 eggs. Mr. N. A. Singer's B. bird finished her last month's break of 52, and Mr. R. Burn's D. bird has an unbroken run 23 eggs to her credit. The following are the individual scores:—

Competitors.	Breed.	Oct.	Total.
--------------	--------	------	--------

LIGHT BREEDS.

*N. A. Singer	...	...	...	...	White Leghorns	...	168	915
C. H. Singer	...	...	...	...	Do.	...	166	882
*W. and G. W. Hindes	...	...	...	...	Do.	...	148	834
*Bathurst Poultry Farm	...	...	...	...	Do.	...	146	769
*T. Fanning	...	...	...	...	Do.	...	141	735
*G. Trapp	...	...	...	...	Do.	...	151	733
*R. Gill	...	...	...	...	Do.	...	158	732
*W. A. Wilson	...	...	...	...	Do.	...	143	728
*Mrs. L. Andersen	...	...	...	...	Do.	...	145	726
J. H. Jones	...	...	...	...	Do.	...	143	726
*S. L. Grenier	...	...	...	...	Do.	...	149	726
*J. M. Manson	...	...	...	...	Do.	...	149	721
*W. Becker	...	...	...	...	Do.	...	147	711
*H. P. Clarke	...	...	...	...	Do.	...	151	706
A. G. C. Wenck	...	...	...	...	Do.	...	135	704
*J. W. Newton	...	...	...	...	Do.	...	154	694
*G. Williams	...	...	...	...	Do.	...	136	676
*R. C. Cole	...	...	...	...	Do.	...	144	676
*O. Goos	...	...	...	...	Do.	...	138	669
*C. Goos	...	...	...	...	Do.	...	144	665
*Oakleigh Poultry Farm	...	...	...	...	Do.	...	148	659
*H. Fraser	...	...	...	...	Do.	...	147	657
*Mrs. R. Hodge	...	...	...	...	Do.	...	139	648
B. Hawkins	...	...	...	...	Do.	...	121	642
*J. W. Short	...	...	...	...	Do.	...	140	627
*R. C. J. Turner	...	...	...	...	Do.	...	155	627
*M. F. Newberry	...	...	...	...	Do.	...	151	623
J. Purnell	...	...	...	...	Do.	...	113	623
*Mrs. E. White	...	...	...	...	Do.	...	133	615
*C. M. Pickering	...	...	...	...	Do.	...	138	611
*Thos. Taylor	...	...	...	...	Do.	...	134	611
A. Maslin	...	...	...	...	Do.	...	100	606
N. J. Nairn	...	...	...	...	Do.	...	134	601
*F. Birchall	...	...	...	...	Do.	...	145	593
T. H. Craig	...	...	...	...	Do.	...	116	592
E. Stephenson	...	...	...	...	Do.	...	133	583
*E. A. Smith	...	...	...	...	Do.	...	125	570
G. F. Richardson	...	...	...	...	Do.	...	121	569
E. Symons	...	...	...	...	Do.	...	124	561
B. C. Bartlem	...	...	...	...	Do.	...	120	554
A. Anders	...	...	...	...	Do.	...	127	520
H. Trappett	...	...	...	...	Brown Leghorns	...	132	501
Brampton Poultry Farm	...	...	...	...	White Leghorns	...	113	488
Parisian Poultry Farm	...	...	...	...	Brown Leghorns	...	112	332

EGG-LAYING COMPETITION—*continued.*

Competitors.	Breed.	Oct.	Total.
HEAVY BREEDS.			
*R. Burns	Black Orpingtons ...	158	808
*A. E. Walters	Do.	131	777
*T. Hindley	Do.	130	734
*R. Holmes	Do.	123	716
*H. M. Chaille	Do.	110	706
Mrs. A. Kent	Do.	122	685
*C. C. Dennis	Do.	140	685
Jas. Hutton	Do.	120	676
*E. F. Dennis	Do.	136	651
Mrs. A. E. Gallagher	Do.	128	637
R. Innes	Do.	136	625
*Jas. Potter	Do.	108	603
H. B. Stephens	Do.	145	587
W. Becker	Chinese Langshans ...	123	570
*Rev. A. McAllister	Black Orpingtons ...	100	570
Mrs. L. Maund	Do.	100	569
V. J. Rye	Do.	104	556
C. Doan	Do.	127	554
Wambo Poultry Farm	Do.	104	554
*Parisian Poultry Farm	Do.	115	549
Jas. Hitchcock	Do.	113	543
C. Rosenthal	Do.	109	497
W. C. Trapp	Do.	73	430
R. Burns	Silver-laced Wyandottes	92	427
*J. E. Smith	Barred Rocks	87	387
Miss L. Hart	Rhode Island Reds ...	113	290
Total ... ..	...	9,125	44,127

* Indicates that the pen is being single tested.

DETAILS OF SINGLE HEN PENS.

Competitors.	A.	B.	C.	D.	E.	F.	Total.
LIGHT BREEDS.							
N. A. Singer	136	171	143	156	154	155	915
W. and G. W. Hindes	149	133	144	134	147	127	834
Bathurst Poultry Farm	103	108	137	139	153	127	769
T. Fanning	91	150	132	132	151	79	735
Geo. Trapp	133	113	118	131	114	124	733
R. Gill	135	131	137	117	100	112	732
W. A. Wilson	118	112	101	134	127	136	728
Mrs. L. Andersen	144	99	126	119	118	120	726
S. L. Grenier	121	89	127	127	129	133	726
J. M. Manson	122	108	128	106	135	122	721
W. Becker	115	90	130	117	124	135	711
H. P. Clarke	121	103	124	130	112	116	706
J. W. Newton	138	116	131	96	123	90	694
G. Williams	106	116	130	113	110	101	676
R. C. Cele	128	114	126	86	111	111	676
O. Goos	111	95	123	132	117	91	669
C. Goos	87	97	100	122	143	116	665
Oakleigh Poultry Farm	122	102	114	98	99	124	659
H. Fraser	113	122	112	100	96	114	657
Mrs. R. Hodge	133	81	109	102	127	96	648
J. W. Short	108	104	124	88	90	113	627

EGG-LAYING COMPETITION—continued.
DETAILS OF SINGLE HEN PENS—continued.

Competitors.	A.	B.	C.	D.	E.	F.	Total.
LIGHT BREEDS—continued							
R. C. J. Turner	113	95	118	112	110	79	627
M. F. Newberry	113	82	74	133	97	124	623
Mrs. E. White	117	40	123	79	134	122	615
C. M. Pickering	124	120	78	97	108	84	611
Thos. Taylor	121	90	107	103	100	90	611
F. Birchall	102	113	74	62	128	114	593
E. A. Smith	107	87	110	101	79	86	570
HEAVY BREEDS.							
R. Burns	127	136	121	147	140	137	808
A. E. Walters	130	118	105	130	151	143	777
T. Hindley	103	125	79	166	162	99	734
R. Holmes	91	149	121	120	109	126	716
H. M. Chaille	135	115	132	110	126	88	706
C. C. Dennis	112	126	118	102	122	105	685
E. F. Dennis	108	107	131	56	120	129	651
J. Potter	98	100	111	100	119	75	603
Rev. A. McAllister	101	117	123	71	39	119	570
Parisian Poultry Farm	68	91	103	69	107	111	549
J. E. Smith	43	80	54	54	72	84	387
Miss L. Hart.. ..	55	58	45	57	27	48	290

CUTHBERT POTTS, Principal.

HOME TANNING—II.*

Numerous requests have reached the Department of Agriculture and Stock for directions for tanning hides on a small scale. Usually the tanning of a few hides or skins by inexperienced persons or those lacking adequate facilities cannot be recommended from the view point either of national economy or of individual profit. Sometimes, however, circumstances arise when a knowledge of tanning is of particular value on the farm. From time to time various methods of tanning have been described in the Journal. The latest information, containing possibly some new ideas, we have embodied in D.C. 230 of the U.S. Department of Agriculture on "Home Tanning," issued in July of this year, and from which the following notes are abstracted. The first part was published in the November Journal.—Ed.

CHROME-TANNED LEATHER.

Read the directions through before starting this work.

For many purposes chrome-tanned leather is considered to be as good as the more generally known bark- or vegetable-tanned leather. The chrome process, which requires only a few weeks as against as many months for the bark-tanning process, derives its name from the use of chemicals containing chromium or "chrome." It is a chemical process requiring care and attention. It is felt, however, that by adhering strictly to the directions here given, never disregarding details which may seem unimportant, a satisfactory and serviceable leather can be produced in a comparatively short time. The saving in time seems sufficient to justify a trial of the procedure.

Slaking Lime.

For each hide, and for not more than three small skins, put 8 pounds of lump, burnt, or caustic lime in a clean half barrel, wooden tub, or bucket, of at least 5 gallons capacity. Use only good-quality lime, free from dirt and stones

*Department Circular 230, by R. W. Frey, I. D. Clarke, and F. P. Veitch, Bureau of Chemistry, United States Department of Agriculture (July, 1922).

and never air-slaked. To the lime add about 1 quart of water. As the lime begins to slake, add more water, a little at a time, to keep the lime moist; do not pour in enough water to quench the slaking. After the lime appears to be slaked, stir in 2 gallons of clean water. Do all this just exactly as you would make whitewash. Slake the lime on the same day that you start soaking the hide or skin, and keep the limewater covered with boards or sacks until ready to use.

If available, fresh hydrated lime, not air-slaked, may be used instead of slaking burnt or caustic lime. In this case use 10 pounds in 4 or 5 gallons of water.

Soaking and Cleaning.

If the hide has been salt-cured, shake it vigorously to remove most of the salt. Spread it out, hair side down, and trim off the tail, the head back of the ears, shanks, and all ragged edges.

Now swing the hide or skin, hair side up, lengthwise, over a smooth log or board, and, with a sharp knife, split it from neck to tail, straight down the backbone line, into two half hides, or "sides." If the hide is large or "spready," it is more convenient to split each side lengthwise into two strips, making the strip with the backbone edge about twice as wide as the belly strip. Thus a whole hide will give two sides or four strips. In these directions the word "side" should be taken to mean either side or strip, as the case may be.

For a medium or large hide fill a clean 40- to 50-gallon barrel with clean, cool water; for a small skin a half-barrel or tub may be used. Hang the sides over sticks or pieces of rope and suspend them in the barrel of water to soak for two or three hours. Stir them about frequently to soften, loosen, and wash out the blood, dirt, manure, and salt. (The sticks or pieces of rope may be held in the proper position by tying a loop of cord on each end and catching the loops over nails in the outside of the barrel near the top.) After soaking for about three hours, take out the sides and place them, one at a time, hair side up, over a "beam." (A ready-made beam can be purchased, but a fairly satisfactory one can be made from a very smooth slab, log, or thick planed board, from 1 to 2 feet wide and 6 to 8 feet long. The slab or log is inclined, with one end resting on the ground and the other extending over a box or trestle so as to be about waist high.) With the side lying hair side up over the beam, scrub off all dirt and manure, using if necessary a stiff brush; then wash off with several bucketfuls of clean water.

Now turn the side over, flesh side up, and scrape or cut off any flesh remaining. Work over the entire flesh side with the back edge of a drawing or butcher knife, held firmly by both ends while pushing away from you hard against the hide or skin. Wash off with a bucket or two of clean water. This working over should always be done, as it helps to soften the hide. Refill the soak barrel with clean, cool water, and hang the sides in it as before, working them about frequently until they are soft and flexible. A green or fresh hide usually needs to be soaked for not more than 12 to 24 hours; a green salted hide for not more than 24 to 48 hours.

When the sides are properly softened, that is, about like a fresh hide or skin, throw them over the beam, and again work over the flesh side with the back edge of a knife as directed before.

Hides and skins must be soft, pliable, and clean all over before being put into the lime.

Liming to Remove the Hair.

Wash out the soak barrel and pour into it all of the slaked lime. Nearly fill the barrel with clean, cool water, and stir thoroughly. Hang the sides again over the short sticks or pieces of rope, hair side out, and suspend them in the barrel so that they are completely covered by the limewater. Cover the barrel with boards or bags. Plunge the hides and stir the limewater three or four times each day until the hair will come off easily. This will take from 6 to 10 days in summer and from 6 to 16 days in winter. When thoroughly limed, the hair can be rubbed off readily with the hand. Early in the liming process it will be possible to pull out the hair, but the hide must be left in the lime until the hair comes off by rubbing over with the hand.

When limed, throw the sides, hair side up, over the beam, and, with the back edge of a drawing or butcher knife, held nearly flat against the hide, push off the hair from all parts of the hide. If the hide is sufficiently limed, a curdy or cheesy layer of skin rubs off with the hair. If this layer does not rub off, the sides must be returned to the limewater. Now thoroughly work over the grain or hair side with a dull-edged tool to get out as much lime, grease, and dirt as possible. Then turn the side over and do the same thing, being sure to remove all fleshy matter.

Shave down to the hide itself, but be careful not to cut into it. Remove the flesh by scraping or by using a sharp knife with a motion like that of shaving your face. Rinse off both sides of the hide with clean water.

For sole, belting, and harness leathers, soak and wash the hide in cool water for about six hours, changing the water four or five times, and then proceed as directed under "Drenching."

For strap, upper, and thin leathers, put the limed white hide or skin into a wooden or fibre tub of clean, lukewarm (about 90 deg. F.) water for four to eight hours, depending upon the size of the hide or skin, and stir about occasionally. Be sure not to get the water too hot, never so hot that it is uncomfortably warm to the hand. After this treat the hide or skin as directed under "Drenching."

The lime, limewater, sludge, and fleshings from the liming process may be used as fertilizer, being particularly good for acid soils. The hair, as it is scraped from the hide, may be collected separately, and, after being rinsed several times, may be used in plastering. If desired, it can be thoroughly washed with many changes of water until absolutely clean and, after drying out in a warm place, can be used for padding, upholstering, insulation of pipes, etc.

Drenching.

Drenching is necessary to remove the lime which the hide or skin still contains and to make it soft and pliable.

For each large hide or skin buy 3 ounces of U.S.P. lactic acid (or 9 ounces of tannery 22 per cent. lactic acid). Nearly fill a clean 40- to 50-gallon barrel with clean, cool water, and stir in the lactic acid, mixing thoroughly with a paddle. Suspend the sides in this solution for 24 hours or overnight, plunging them up and down occasionally.

For light skins, weighing less than 15 pounds, use only 1 ounce of U.S.P. lactic acid in about 20 gallons of water.

If lactic acid cannot be obtained, use 1 pint of vinegar for every ounce of lactic acid. An effort should be made to get the lactic acid, for vinegar will not be as satisfactory, especially for the medium and smaller skins.

After drenching, work over both sides of the hide or skin, as directed under "Liming."

For sole, belting, and harness leathers, hang the sides in a barrel of cool water overnight; then proceed as under "Tanning."

For thin, softer leathers from the small skins, simply rinse off with water after working from the drench. Do not soak in water overnight, but proceed to the "Tanning."

Tanning.

The tanning solution should be made up at least two days before it is to be used; that is, not later than when the hide or skin is taken from the limewater for the last time.

Remember that this is a chemical process and all materials must be of good quality and accurately weighed, and that the specified quantities of water must be carefully measured.

The following chemicals are required: Chrome alum (chromium potassium sulphate crystals); soda crystals (crystallized sodium carbonate); and common salt (sodium chlorid). Insist upon pure chemicals of U.S.P. quality. Get them from the nearest drug store or find out from it the address of a chemical manufacturing concern which can supply you.

For each hide or skin weighing over 30 pounds, use the following quantities for the stock chrome solution:

Dissolve $3\frac{1}{2}$ pounds of soda crystals (crystallized sodium carbonate) and 6 pounds of common salt (sodium chlorid) in 3 gallons of warm, clean water in a wooden or fibre bucket. The soda crystals must be clear or glasslike. Do not use the white crusted lumps. *This is important.*

At the same time dissolve, in a large tub or half barrel, 12 pounds of chrome alum (chromium potassium sulphate crystals) in 9 gallons of cool, clean water. This will take some time to dissolve and will require frequent stirring. Here again it is important to use only the very dark, hard, glossy purple or plum-coloured crystals of chrome alum, not the lighter, crumbly, dull lavender ones.

When the chemicals are dissolved, which can be told by feeling around in the tubs with a paddle, pour the soda-salt solution slowly in a thin stream into the

chrome-alum solution, stirring constantly. Take at least 10 minutes to pour in the soda solution. This should give one solution of about 12 gallons which is the *stock chrome solution*. Keep this solution well covered in a wooden or fibre bucket, tub, or half barrel.

To start tanning, pour one-third (4 gallons) of the stock chrome solution into a clean 50-gallon barrel and add about 30 gallons of clean, cool water; that is, fill the barrel about two-thirds full. Thoroughly mix the solution in the barrel and suspend in it the sides taken from the drenching. Work the sides about and stir the solution frequently, especially the first two or three days. This helps to make the sides evenly coloured and should be done every hour or so throughout the first day. Keep the suspended sides as smooth as possible.

After three days, temporarily remove the sides from the barrel, add one-half of the remaining stock chrome solution, thoroughly mixing it with that in the barrel, and again hang in the sides. Move the sides about and stir the solution three or four times each day.

After three more days, again temporarily remove the sides, and pour into the barrel the rest of the stock chrome solution, thoroughly mixing it with that in the barrel, and again hang in the sides. Move the sides about and stir frequently as before.

After three or four days in this solution, cut off a small piece of the thickest part of the hide, generally in the neck, and examine the freshly cut edge of the piece. If the hide seems to be evenly coloured greenish or bluish all the way through, the tanning is about finished. Boil the small piece which you have just cut off in water for a few minutes. If it curls up and becomes hard or rubbery, the tanning is not completed and the sides must be left in the tanning solution for a few days more, or until a small piece when boiled in water is changed little if at all.

The foregoing quantities and directions have been given for a medium or large hide. For smaller hides and skins the quantities of chemicals and water can be reduced. For each hide or skin weighing less than 30 pounds, or for two or three small skins together weighing not more 30 pounds, the quantities of chemicals may be cut in half, giving the following solutions:

For the soda-salt solution dissolve $1\frac{1}{2}$ pounds of soda crystals (crystallized sodium carbonate) and 3 pounds of common salt (sodium chlorid) in $1\frac{1}{2}$ gallons of clean water.

For the chrome-alum solution dissolve 6 pounds of chrome alum (chromium potassium sulphate crystals) in $4\frac{1}{2}$ gallons of cool, clean water.

When the chemicals have dissolved pour the soda-salt solution slowly into the chrome-alum solution as already described. This will give one solution of about 6 gallons which is the *stock chrome solution*. For the lighter skins tan with this solution, exactly as directed for medium and large hides, adding one-third, that is, 2 gallons of this stock chrome solution, each time, and begin to tan in about 15 gallons of water instead of 30 gallons. Follow the directions already given as to stirring, number of days, and testing to determine when tanning is completed. Very small, thin skins probably will not take as long to tan as will the large hides. The boiling-water test is very reliable for showing when the hide is tanned.

Washing and Neutralizing.

When the hide or skin is tanned, take the sides out of the tanning solution and put them in a barrel of clean water. The barrel in which the tanning was done can be used after it has been thoroughly washed. (When emptying the tanning barrel be sure to carefully dispose of the tanning solution. While this solution is not poisonous to the touch, it would probably be fatal to the animals and stock of the farm should they drink it, and is furthermore harmful to the soil.) Wash the sides in about four changes of water. For medium and large hides, dissolve 2 pounds of borax in about 40 gallons of clean water and soak the sides in this solution overnight. For smaller hides and skins, weighing less than 25 pounds, use 1 pound of borax in about 20 gallons of water. The sides or skins should be moved about in the borax solution as often as feasible. After soaking overnight in the borax solution, remove the sides and wash them for an entire day, changing the water 5 or 6 times. Take the sides out, let the water drain off, and proceed as under "Dyeing black." If it is not desired to blacken the leather, proceed as under "Oiling and finishing."

Dyeing Black.

Water-soluble nigrosine.—One of the simplest and best means of dyeing black is with nigrosine. Make up the dye solution in the proportion of a half ounce of water-soluble nigrosine dissolved in $1\frac{1}{2}$ pints of water. Be sure to get water-soluble

nigrosine. Evenly mop or brush this solution over the wet chrome leather after draining as already directed and then proceed as directed under "Oiling and finishing."

Iron liquor and sumac.—If water-soluble nigrosine cannot be obtained, a fairly good black can be produced with iron liquor and sumac. To make the iron liquor, mix clean iron filings or turnings with a half gallon of good vinegar and let stand for several days. See that there are always some undissolved filings or turnings in the vinegar. For a medium or large hide, put 10 to 15 pounds of dried, crumbled sumac leaves in a barrel containing 35 to 40 gallons of warm water. Stir well, and, when cool, hang in it the wet, chrome-tanned sides. Leave the sides in this solution for about two days, plunging and mixing the solution frequently. Take out the sides, rinse off all particles of sumac, and evenly mop or brush over with the iron liquor. Rinse off the excess of iron liquor and put the sides back in the sumac overnight. If not sufficiently black the next morning, mop over again with iron liquor, rinse, and return to the sumac solution for a day. Take out of the sumac, rinse well, and scrub thoroughly with warm water. Finally wash the sides for a few hours in several changes of water.

While both of these formulas for blackening have been given, it is recommended that water-soluble nigrosine be used whenever possible, as the iron liquor and sumac formula is somewhat troublesome and may produce a cracky grain. After blackening, proceed as under "Oiling and finishing."

Oiling and Finishing.

Thin leather.—Let the wet tanned leather from the dyeing, or from neutralizing if not dyed, dry out slowly until very damp. Then go over the grain side with a liberal coating of neat's-foot or cod oil. While still damp, tack the sides out on a wall or tie in a frame, being sure to pull out tight and smooth, and leave until dry. When dry, take down and dampen well by dipping in warm water or by rolling up in wet sacking or burlap. When uniformly damp and limber, go over the sides with a "slicker," working them out on the grain side in all directions. (A slicker can be made from a piece of copper or brass about one-fourth inch thick, 6 inches long, and 4 inches wide. One long edge of the slicker is mounted in a wooden handle and the other long edge, well rounded, is used to work over the sides by pushing hard against them and away from yourself.) After slicking, it may be necessary to "stake" the leather. That is done by pulling the damp leather vigorously back and forth over the end of a small smooth board about 2½ feet long, 6 inches wide, and 1 inch thick, fastened upright and braced to the floor or ground. The top end of the board must be shaved down to a wedge shape, with the edge not more than one-eighth inch thick and the corners well rounded. Pull the sides or skins backward and forward over this edge, flesh side down, exactly as a cloth is worked back and forth in polishing shoes. Let the sides dry out thoroughly again, and, if not sufficiently soft and pliable, dampen with water, apply more oil, and slick and stake as before. The more time given to slicking and staking, the smoother and more pliable the leather will be.

Thick leather.—Thick leather from the larger hides is oiled and finished in a slightly different manner. For harness and strap leather let the tanned sides, dyed if desired, dry down until still quite damp. Then slick over the grain side thoroughly and apply a liberal coating of neat's-foot or cod oil. Tack on a wall or tie in a frame, stretching the leather out tight and smooth, and leave until dry. Then take down, dampen with warm water until limber and pliable, and apply to the grain side a thick coating of a dubbin made by melting together about equal parts of cod oil and tallow or neat's-foot oil and tallow. This dubbin when cool must be soft and pasty but not liquid. If too nearly liquid, add more tallow. Hang up the sides again and leave until thoroughly dried. When dry, remove the tallow from the surface of the leather by working over with the slicker. If more grease in the leather is desired, dampen again and apply another coating of the dubbin. When again dry, slick off the tallow and thoroughly work over all parts of the leather with the slicker. Rubbing over with sawdust will help to take up any surface oiliness.

Chrome-tanned leather is inclined to be stretchy, so that in cutting up the leather for use in harness, straps, reins, and similar articles it is best to first take out most of the stretch.

Chrome leather for shoe soles must be heavily greased, or, in other words, waterproofed, unless it is to be worn in extremely dry sections of the country. Waterproofing may be done after repairing the shoes by setting them in a shallow pan of oil or grease, so that just the soles are covered by the grease. The soles should be dry before setting them in the melted grease. Melted paraffin wax will do, although it makes the soles stiff. The simple formulas given on page 11 are satisfactory for waterproofing chrome sole leather.

ALUM-TANNED LACE LEATHER.

Lace leather should be made from good sound hides, preferably steer hides. The weight of the hides used may vary from 20 to 40 pounds, depending upon the thickness of leather desired.

Slacking Lime.

Place about 6 pounds of burnt or caustic lime in a clean wooden tub. Add about 1 quart of water. As the lime begins to slake, add more water, a little at a time, to keep the lime moist; do not pour in water enough to quench the slaking. After the lime appears to be slaked, stir in a gallon or two of clean water. Do all this just exactly as you would make whitewash. Slake the lime the day you start soaking the hide, and keep the tub covered until used.

If burnt lime is not available, fresh hydrated lime (not air-slaked) may be used. In this case stir 8 pounds of hydrated lime into a barrel of water and proceed as directed under "Liming."

Soaking and Cleaning.

If the hide has been salted, shake vigorously to remove most of the salt. Spread it out, hair side down, and trim off the tail, head, ears, all ragged edges, and shanks.

Place the hide, hair side up, lengthwise, over a log or board, and, with a sharp knife, cut it from nose to tail, straight down the backbone line, into 2 "sides." It will be more convenient in subsequent handling, especially when the hide is large, to then split each side lengthwise into 2 strips. The back strip will make the better leather and should be about twice as wide as the belly strip.

Fill a barrel with clean, cool water. Place the strips in the barrel to soak for two or three hours, with frequent stirring, to soften the sides and loosen and soak out the blood, dirt, manure, and salt. Take the strips out of the barrel and place them, one at a time, hair side up, on a smooth slab, log, or thick planed board, from 1 to 2 feet wide and 6 to 8 feet long, one end of which rests on the floor and the other extends over a box or trestle so as to be about waist high. Scrub off all dirt and manure, and wash with several bucketfuls of clean water.

Now turn the strip over, flesh side up, and carefully cut off most of the meat or flesh. Work over the entire flesh side with the back edge of a drawing or butcher knife, held firmly by both ends, while pushing away from you hard against the strip. Wash off with a bucket or two of clean water. This working over should always be done. Refill the barrel with clean, cool water and put the strips back. Pull them up and stir frequently until they are soft and flexible. A green hide usually needs to be soaked for not more than 10 to 20 hours; a green salted hide for not more than 20 to 40 hours.

When the strips are properly softened, throw them over the slab or beam and thoroughly scrape off all remaining flesh or meat with the back edge of the drawing or butcher knife. It is of the greatest importance to remove all of this meat. When it can not be scraped off, cut it off, but be very careful not to cut into the hide itself. Even should there appear to be no flesh to take off and nothing appears to be removed, it is necessary to thoroughly work over the flesh side in this way with the back of the knife. Finally wash off with a bucketful of clean water.

Liming to Remove the Hair.

Wash out the soak barrel. Pour in the slaked lime; nearly fill the barrel with clean, cool water; and stir thoroughly. Hang each strip, hair side up, over a separate piece of rope and suspend in the limewater. Fasten the ends of the ropes to the barrel so that the strips are entirely covered by the limewater, and cover the barrel with a bag or board. Pull up the strips and stir the lime three or four times each day until the hair will rub off easily from all parts of each strip. This will take from 5 to 8 days in summer and from 6 to 16 days in winter.

When limed, throw the strips, hair side up, over a smooth, slanting slab or board, and, with the back of a drawing or butcher knife, held nearly flat against the hide, push the hair off. If the hide is sufficiently limed, a curdy or cheesy layer of skin rubs off with the hair. If this layer does not thus rub off, the strips must be returned to the limewater. After removing the hair, put the strips back in the lime for another day, until any fine hairs that may remain can be easily rubbed off. Now thoroughly work over the grain or hair side with the back of the knife

to "scud" out as much lime, fat, and dirt as possible. Turn the strip over and do the same thing, being sure to remove any meat that may remain on the hide. Then throw the strips into a wooden or fibre tub of clean, lukewarm water and let them remain for from six to eight hours, stirring occasionally.

Drenching.

Drenching is necessary to remove the lime which the hide still contains and to make it soft and pliable.

Buy 3 ounces of U.S.P. lactic acid at the drug store. Nearly fill a clean barrel with clean, cool water, and stir the 3 ounces of lactic acid into it with a clean paddle. Take the strips out of the tub of water, throw them into the barrel of acid, and pull up and stir frequently for 10 to 12 hours or overnight. Now work over or "scud" thoroughly both sides of each strip as is directed under "Liming," and put them in a tub of cool, clean water.

Lactic acid helps to make a softer leather, but if it cannot be bought use $\frac{1}{2}$ gallon of vinegar instead.

Tanning.

While the strips are being drenched, thoroughly wash out the barrel in which the hide was limed. Place in it 15 gallons of clean water and 12 pounds of ammonia alum, or potash alum, and stir frequently until it is completely dissolved.

Dissolve 3 pounds of washing soda (crystallized sodium carbonate) and 6 pounds of salt in 5 gallons of cold, clean water in a wooden bucket. The soda crystals must be clean and transparent (glasslike). Do not use white opaque lumps.

Now pour the soda solution into the alum solution in the barrel very, very slowly, stirring the solution in the barrel constantly. Take at least 10 minutes to pour in the soda solution in a small stream. If the soda is poured in rapidly the solution will become milky, and it will not tan. The solution should be cool, and enough water should be added to nearly fill the barrel.

Hang each well-washed strip from the drench in the alum-soda solution. Pull up the strips and stir the solution six to eight times each day. (Do not put the bare hands in the liquor if they are cut or cracked or have sores on them. The alum will make them worse.)

After six or seven days, remove the strips from the alum-soda solution and rinse well for about one-fourth hour in clean, cold water. Drain on clean boards for one-half hour; then hang up by one edge to dry in a moderately warm place free from draughts. Turn the strips every hour, so that first one edge and then the other is up. If this is not done, the lower edge may become cracky. Be sure not to let the strips dry completely and become stiff. If one part of the strip dries faster than another, which is especially likely to occur on the edges, moisten these drier places with water.

While the strips are yet damp but have become somewhat stiff, about like a bridle or driving rein, and can be sharply bent without cracking, begin to work or "stake" them. That is, pull them vigorously back and forth lengthwise over the end of a small smooth board, about $2\frac{1}{2}$ feet long, 6 inches wide, and 1 inch thick, fastened upright and braced to the floor or ground. The top end of the board must not be more than one-eighth inch thick and the corners must be well rounded. Pull the strip backward and forward, flesh side down, exactly as a cloth is worked backward and forward in polishing shoes. Do this vigorously, but do not cut holes in the hide. The strips must be staked very thoroughly all over in order to make them pliable and soft. The more time given to staking, the more pliable the lace leather will be. The staking must be done in a clean place where the strips will not get dirty.

After staking, lay the strips flat on a large, low table or on smooth boards, grain side down, and go over the flesh side thoroughly with the back of the knife, or better, with a piece of wedge-shaped hickory, about 6 inches square and one-half inch thick at the head of the wedge. The narrow end of the wedge should be from one-thirty-second to one-sixteenth inch thick and very smooth. Work the flesh side of the hide with this slicker, holding it in both hands by the top and pushing away from you, to remove all adhering flesh and dirt. Turn the strip over and work the grain side also.

Melt together 3 pounds of tallow and 1 pint of neat's-foot, cod, or fish oil. While the strips are still soft and uniformly damp (if they are not damp at this stage, cover them in damp sawdust until they are uniformly moist all over, but not wet). Rub a heavy coat of the melted grease mixture all over both sides of each

strip. This should be done in a very warm place, and the grease should be as hot as the hand can bear without discomfort.

Roll the greased strips together and keep them in a very warm place for two or three days. Unroll and again stake thoroughly. If too dry and stiff to stake readily, cover them with damp sawdust until they are soft enough. After drying, if the leather is not sufficiently soft and pliable, again apply dubbin to both sides exactly as before, and lay away rolled for two days. Again stake and then work over both sides with the hickory slicker to more thoroughly work in the grease and remove the excess.

The strips should now be very supple and pliable, even after they are thoroughly dried out. If they are not, they must be vigorously and thoroughly staked all over and redubbed with oil only, staked, and slicked, until they remain soft and pliable. Thorough, vigorous staking of the nearly dry leather is absolutely essential to produce the desired softness and pliability. When dry, soft, and pliable, the leather is ready for use.

RAINFALL IN THE AGRICULTURAL DISTRICTS.

TABLE SHOWING THE AVERAGE RAINFALL FOR THE MONTH OF OCTOBER IN THE AGRICULTURAL DISTRICTS, TOGETHER WITH TOTAL RAINFALLS DURING OCTOBER, 1922 AND 1921 FOR COMPARISON.

Divisions and Stations.	AVERAGE RAINFALL.		TOTAL RAINFALL.		Divisions and Stations.	AVERAGE RAINFALL.		TOTAL RAINFALL.	
	Oct.	No. of Years' Records.	Oct., 1922.	Oct., 1921.		Oct.	No. of Years' Records.	Oct., 1922.	Oct., 1921.
<i>North Coast.</i>					<i>South Coast—continued:</i>				
Atherton ...	In. 0.99	21	In. 0.87	In. 2.65	Nambour ...	3.15	26	0.49	1.82
Cairns ...	2.01	40	1.33	3.96	Nanango ...	2.31	40	1.40	0.99
Cardwell ...	2.08	50	1.69	5.31	Rockhampton ...	1.90	35	2.47	3.35
Cooktown ...	1.15	46	0.10	1.59	Woodford ...	2.61	35	2.00	1.20
Herberton ...	0.96	35	0.58	2.89					
Ingham ...	1.63	30	3.30	4.91					
Innisfail ...	3.05	41	2.90	5.59					
Mossman ...	3.21	14	1.96	4.10					
Townsville ...	1.28	51	1.89	5.78					
<i>Central Coast.</i>					<i>Darling Downs.</i>				
Ayr ...	1.02	35	0.95	3.57	Dalby ...	2.11	52	1.35	1.36
Bowen ...	1.08	51	0.18	3.41	Emu Vale ...	2.32	26	1.11	1.78
Charters Towers ...	0.72	40	0.05	3.29	Jimbour ...	1.85	34	1.74	1.02
Mackay ...	1.87	51	1.76	1.79	Miles ...	1.99	37	1.64	1.29
Proserpine ...	1.35	19	0.97	2.88	Stanthorpe ...	2.63	49	1.55	4.16
St. Lawrence ...	1.88	51	0.23	2.08	Toowoomba ...	2.66	50	1.50	1.33
					Warwick ...	2.35	57	1.59	2.57
<i>South Coast.</i>					<i>Maranoa.</i>				
Biggenden ...	2.30	23	1.22	1.83	Roma ...	1.75	48	3.40	1.87
Bundaberg ...	2.14	39	0.80	0.80					
Brisbane ...	2.62	71	2.10	1.36					
Childers ...	2.48	27	0.33	1.47					
Crohamhurst ...	3.45	29	1.40	1.93					
Esk ...	2.43	35	4.78	1.08					
Gayndah ...	2.41	51	0.73	0.89					
Gympie ...	2.76	52	0.50	2.61					
Glasshouse Mts. ...	2.86	14	1.80	11.67					
Kilkivan ...	2.67	43	0.18	1.97					
Maryborough ...	2.74	51	0.29	0.73					
					<i>State Farms, &c.</i>				
					Bungeworgorai ...	1.31	8	2.27	1.23
					Gatton College ...	2.25	23	...	0.67
					Gindie ...	1.39	23	2.15	0.40
					Hermitage ...	1.99	16	1.59	2.50
					Kairi ...	1.26	8	...	2.66
					Sugar Experiment Station, Mackay	1.71	25	1.45	1.60
					Warren ...	2.60	8	0.75	1.10

NOTE.—The averages have been compiled from official data during the periods indicated; but the totals for October this year, and for the same period of 1921, having been compiled from telegraphic reports, are subject to revision.

GEORGE G. BOND,
State Meteorologist.

FACTORS IN AN IDEAL RATION.

BY J. McLEAN WILSON.

Mr. Wilson is an American authority on stock feeding and breeding and the owner of a Holstein herd. He is in Australia on a health tour, and is at present visiting Queensland.—Ed.

In actually computing a ration for a given purpose there are seven factors that should be considered—

1. Amount of dry matter.
2. Digestibility of the ration.
3. The nutritive ratio.
4. Variety of the ration.
5. Suitability of the feeds to the animal.
6. Palatability of the ration.
7. Cost of the ration.

Amount of Dry Matter.

The amount of dry matter in the ration serves to regulate the relative amounts of roughage and concentrates. By roughage are meant the coarser feeds, such as hay, corn fodder, silage; by concentrates are meant the grains, and the other feeds in the ration that are low in their percentage of fibre and water, and high in their percentage of total digestible nutrients. Ordinarily, in rations for cattle and sheep, if two-thirds of the dry matter is from feeds classed as roughage, and one-third from concentrates, the rations will be bulky enough to distend the digestive organs, so as to give the best results. For horses and swine, more dry matter should be in the grains.

Digestibility of the Ration.

A little more than two-thirds of the dry matter in the ration should be digestible, that is, the amount of total digestible nutrients should be at least two-thirds as much as the dry matter. This relation will change with the purpose of the ration, and with the character of the feed. Any ration for productive purposes, however, which shows that the amount of total digestible nutrients is less than two-thirds as much as the amount of dry matter can be improved.

The Nutritive Ratio.

It will be noticed that the rations for growing animals and for milk production are 1:7 or narrower, while the rations for fattening and for labour may be somewhat wider. In none of the rations except in the case of the youngest animals does the nutritive ratio go below 1:4.5. Formerly, it was thought that feeders must calculate the nutritive ratio of "balance" the ration with much exactness. This is no longer considered to be necessary, due to further knowledge in respect to the functions of the nutrients and to the fact that the nutrient protein is not so expensive as in former years. If the nutritive ratio given for the purpose is considered to be the widest ration for the best results, and if no ration is made narrower than 1:4.5 except in the case of the youngest animals (which are growing new tissue very rapidly) the ration will be satisfactory.

Variety in the Ration.

All feeders of animals should provide variety in the ration. Variety stimulates the animal's appetite. Better results are obtained from a ration containing several feeds than from a ration limited in variety. A ration for any animal should have two different feeds in the roughage and three or more feeds in the concentrated part of the ration. These feeds should come from not less than three different plants.

Suitability of Feeds to the Animal.

The feeds in the ration should be suited to the animal and to the purpose for which the animal is fed. For example, wheat bran is not suitable for feeding hogs because of its bulk; wheat middlings are much to be preferred.

Palatability of the Ration.

The ration should be palatable if the best results in production are to be obtained. With dairy cows palatability is easily obtained by providing succulent feeds in the ration. The condition of the feed has much to do with its palatability. No musty nor damaged feed should be given to any animal.

Cost of the Ration.

Without doubt, the cost of the ration is the most important factor to be considered by the farmer. However, the other factors must not be sacrificed for cost in every case. A rough way, efficient in most cases, to choose feeds for the greatest economy in the ration is to calculate the cost of 100 lb. of total digestible nutrients in the different feeds available, then to choose those that will yield total digestible nutrients the cheapest—always taking into consideration the six other factors that have just been explained.

HEAVY COST OF FEEDING.

- A. Low yield.
- B. Extravagant feeding.
- C. Indiscriminate purchase of feeding stuffs.
- D. Bad management.

A. Calculations show that the more eggs a hen lays the cheaper becomes the cost per egg. Because a 300-egg hen does not require twice as much food, &c., as the 150-egg hen. The most economically managed animals are those that yield well on a normal ration, a matter mainly of *breeding* and *selection*.

Extravagant Feeding.

B. Cases have come under observation, during various investigations where animals of the same number—producing different quantities—but of the same breed and average weight have been fed the same daily allowance. One lot were apparently overfed, while on the other hand, the other lot may have been underfed. Oftimes overfeeding is the case frequently in the feeding of an excessive amount of green-stuff, or commonly named roughages, but more often in the excessive feeding of the foods. The practice of rationing individual animals according to their yield is year by year being more generally adopted.

Indiscriminate Purchase.

C. A farmer when buying should—*first*, know what he wants to buy; *second*, know comparative values. For instance, a food or blending of foods with a protein content of 20 per cent.—providing he is in the market for protein—at £18 per ton is cheaper than one with a protein content of 10 per cent. at £15 per ton. The same rule holds good in the purchase of food for other valuations, such as fat, fibre, &c.

Bad Management.

D. Being a feed expert it would be the height of folly to even offer suggestions as to the general management of your business, that's for others more proficient in the industry to do. Questions relating to feeds and feeding are therefore handled under the foregoing B. and C.

The principle reason for the low yield average in production throughout the world is the lack of knowledge as to the proper feeding of the animal to be fed. There are other reasons also, which may be stated—

1. Lack of ability on the part of the animal to convert food into profitable production.
2. Lack of the proper temperament, constitution, and capacity.
3. Lack of proper amounts of wholesome food.
4. Lack of proper kinds of food.
5. Lack of care and attention.
6. Lack of judgment on the part of the feeder, such as irregularity.
7. Lack of sufficient quantity of *pure* water.

PRODUCTION DEPENDENT ON FEEDING AS WELL AS INTELLIGENT BREEDING AND SKILFUL SELECTION. AVOID HAPHAZARD FEEDING. COMPOSITION OF THE ANIMAL BODY.

The animal body is made up of water and dry matter (ash or mineral matter, protein, carbohydrates, and fats) which comes from the food.

Water.

The animal body when it comes to the point of quantity is largely made up of water. From 40 to 85 per cent. of its gross weight, varying accordingly to its age and condition, consists of water. The water in the animal body serves four purposes: (1) It is a part of all bone and flesh; (2) it serves as a carrier of food from the digestive tract to body cells, wherever they may be located, or from those parts of the body where the food is put into suitable shape to be used by the cells; (3) water removes the wastes of the body through the perspiration and the urine; and (4) it equalises the temperature of the body.

Ash.

Ash or mineral matter is largely found in the bones or skeleton of the body, while other portions of the body may carry small quantities. From 2 to 5 per cent. of the gross weight of the frame is ash. The ash of the animal body consists largely of phosphate of lime. Since ash exists in plentiful quantities in most rations, it need not be considered in a ration, except for young stock or cows producing large quantities of milk.

Protein.

The protein is a very important constituent in the animal body, and contains from 12 to 19 per cent. nitrogen. The flesh, skin, bones (in part), casein and albumin of milk, vital organs, brains, nerves—in fact, the bodily mechanisms—are made up of proteins diluted, so to speak, with water, supported by the ash of the skeleton and rounded out with fat and with water. Protein is a compound made up largely of four elements, carbon, oxygen, hydrogen, and nitrogen.

Carbohydrates.

The carbohydrates of the body are made up of carbon, hydrogen, and oxygen. Very few carbohydrate substances exist in the body, except in the blood. These substances are taken from the blood to furnish the energy of the muscles and part of the heat of the body. The liver acts as a storehouse for carbohydrate and regulates the supply to the blood so that the amount of carbohydrates in the blood is kept uniform for properly supplying the muscles. It is also thought that the liver has the power to make carbohydrates from fats and the protein of the food, if the supply of carbohydrates is limited.

Fats.

These are distributed throughout the body and comprise from 6 to 30 per cent. of the live weight of animals. They consist of carbon, hydrogen, and oxygen, but contain no nitrogen. They consist of the above, and are used to supply energy to the cow and also furnish heat. The fats in the body of the cow are used as a storehouse for heat and energy. They are added to when the food supply is in excess of that needed by the animal for work or production, and they are drawn from when the food supply is short.

COMPOSITION OF FEEDS.

The composition of vegetable matter is made up in a way of substances similar to that of animal matter. Vegetable matter consists of water and dry matter (ash, protein, fat, and carbohydrates, which includes crude fibre and nitrogen free-extract). The dry matter or compounds in vegetable matter varies in proportion and somewhat in composition. In most cases these compounds are not in proper proportions for the best results, so it is necessary for the farmer to mix a number of these feeds to supply the animal with the desired nutrients. From the farmer's standpoint, only three of these food compounds need be considered, because the ash or mineral matter usually is present in sufficient amounts. These three compounds (called nutrients) are protein, carbohydrates, and fat.

Protein in Feeds.

The protein of vegetable matter is a compound composed mostly of carbon, hydrogen, oxygen, and nitrogen. This compound is used to keep up the protein of the body, such as replacing worn out tissues, building new tissues, for growth of hair, hoofs, horns, and for supplying the milk with casein and albumin. Protein cannot be produced in the animal body from carbohydrates and fats of foods.

If there is an excess of protein fed in the ration, it will be used in the production of heat and energy, thus serving the purpose of carbohydrates and fats. Feeds rich in protein are usually higher in price, and while it is always necessary to have a sufficient amount of protein in the ration, the heat and energy demands of the animal body can be more economically met by feeding carbohydrates and fats.

The amount of digestible protein in feed varies from less than 1 per cent. to more than 40 per cent.

Carbohydrates in Feeds.

Carbohydrate is a nutrient which differs from protein in that it does not contain nitrogen, but is made up largely of carbon, hydrogen, and oxygen. It is abundant in our common grasses, in the form of starch, sugar, fibre, &c., and is used by the animal to supply energy, heat, and fat in the body, and, in addition, used by the cow to supply sugar and fat in the milk. It is the cheapest nutrient in our feeds, because it is most abundant; also, it is used in larger quantities by the cow than protein or fat.

Fats in Feeds.

These compounds are made up of nearly the same elements as carbohydrates, and are used by the animal in about the same way. Fats differ from carbohydrates in that they have a heat energy value equal to about two and one-fourth times the energy of the same weight of carbohydrates.

SUMMARY.

The Importance of a Balanced Ration.

1. To support life; to maintain body temperature; to repair and replace body tissues; for the muscular activity of the vital processes.
2. The produce fat, flesh, or milk (production).
3. To perform labour (transform feed into milk).
4. To develop the fœtus.

Nutrients Needed.

1. Varies in different kinds of stock.
2. See nutritive ratios.

Calculating Rations.

1. Palatability.
2. Digestibility.
3. Bulk.
4. Variety.
5. Succulent.
6. Economical.
7. Nutritive ratio.
8. Plenty of protein.
9. Plenty of mineral matter.
10. Suitability.

Water.

Low water content means low production.

Event and Comment.

Cotton Pests—Occurrence on the Downs.

The Minister for Agriculture and Stock (Hon. W. N. Gillies) recently made available a memorandum by the Government Entomologist and Vegetable Pathologist (Mr. H. Tryon) on the failure in growth of young cotton plants in the Darling Downs district. Mr. Tryon stated, respecting the reported Westbrook occurrence, that from the information available he was unable to arrive at the cause of the young plants being cut off just as they were coming through the ground, or being ring-barked if suffered to exist till of somewhat larger growth (P. Felt); for, although certain definite depredators were said to have been formerly implicated, this referred to a time some ten days prior to the visit of Mr. C. J. McKeon, Assistant Instructor in Agriculture, when the cotton no longer existed, and when specimens of the insect, spoken of as "wire worms," were undiscoverable by him. Concerning the cotton field on the farm of Mr. H. Dippel, at Middle Ridge, the foregoing statement, with but little variation, applied to this occurrence also. With regard to the cotton field on the farm of Mr. D. Dippel, in this case Mr. C. J. McKeon found that the young plants to the extent of about 90 per cent. still survived. These (specimens of which were submitted) showed two forms of injury, associated in some instances. In the first place, a small injury in the main stem just below where level with the soil-surface, evidently wrought by some mandibulate insect; and, in the second, a browning and shrinkage of the stem just above and below the soil surface. It could not be affirmed what insect or insects perpetrated the structural injury remarked, for although Mr. McKeon was successful in finding two beetle larvae in the soil after diligent search these insects were only wire worms in appearance—not in reality—nor did they correspond to any known soil-frequenting harmful insect—species apparently inflicted here in some instances by the grub of a small beetle, *Gonocephalum*. The other destructive change remarked was not of parasitic fungus origin. It conformed, however, to what one would expect to find in young cotton that had experienced conditions favourable to its growth, and then high soil-temperatures; especially operative harmfully when the cultivation had been shallow and the surface allowed to cake. Mr. McKeon had been invited to inquire to what extent, if any, these meteorological factors prejudicially affect young cotton growth.

In the case of the occurrence at Wellcamp, on the farm of Mr. J. E. Horrocks, certain young cotton plants that had survived exhibited aphids and symptoms of aphid attack, as shown by samples brought under his (Mr. Tryon's) notice; others manifested the collar-injury above referred to. Mr. McKeon again, in the case of this crop, elicited a history of insect attack to the underground portion of the plant, but nevertheless could find no individuals still persisting in the soil. Aphides would readily kill young cotton plants, especially if numerous, when not kept down by spraying with an appropriate wash, and the more so should hot soil conditions prevail.

It was very unsatisfactory to have so few data to go upon in arriving at the primary cause of the trouble in these instances mentioned. That this was the case was partly owing to the late hour in which the fact of the destruction of the seedling cotton in the instances mentioned had been brought to the Department's notice. There were some grounds for concluding, apart from what might be inferred from the data adduced, that much of the young cotton in these instances of failure had succumbed to meteorological factors acting through the medium of the soil.

The Study of Agriculture.

"Queensland needed the study of the science of agriculture more than any other activity," said the Premier (Hon. E. G. Theodore) in the course of a recent address to the students of Nudgee College. Continuing his remarks, the Premier asserted that Queensland must inevitably become a great agricultural State; it had all the resources to make it a wonderful country. The educational system should, therefore, impress upon the minds of Queensland youth the immensity of the wealth lying latent in her fertile soil. "If I can do anything," added the Premier, "as head of the Government, in interesting my colleague, the Minister for Education, in the development of the idea of such an aim in education, I shall do it with all my heart."

Overcrowded Professions and an Undermanned Industry.

"There had been too much inclination on the part of parents in the past," continued the Premier, "to draft their boys into the polite professions, such as medicine and law. The parents of to-day ought to realise that, as compared with other professions, there was just as much work called for, just as much intelligence required, just as great a force of character needed, just as many of those manly attributes which made for purpose in life, moulded in the study of the science of agriculture and the development of the resources of the soil. Queensland was destined, in the not very distant future, to carry a large population, which would

be earning a livelihood from tilling the soil. It would be only a little time when the farmer would occupy an immeasurably higher position. A man who was a farmer in England did not rate himself socially any lower than a man who was, say, a clerk in the Government service. Neither should it be in Queensland. In the future, there would be no undermining of the dignity of the man who made his livelihood from the land. Quite as much was required to train a man for the tilling of the soil as for any other occupation in life. Knowledge in the first degree was required of the chemistry of the soil and entomology. Knowledge was also required of such scientific things which would make the soil produce the best and add to the prosperity of the State. Our educational system must be so moulded that our farmers would be scientific farmers, and not merely potterers upon the land."

A Field of Opportunity.

"The Government had recently had experience of the want of scientific men," the Premier added. "An expert was required to teach settlers how to grow cotton, and it had to go to America for a man at an expensive salary. A director of agriculture had had to be engaged from India, and an appeal had had to be made down South for a man to train our own men in certain directions. That should not be. The native Queenslander had as much ability and capacity to learn, and was quite as intellectual as the youth of any other country. The boys of to-day, and particularly those in colleges, had wonderfully improved opportunities for learning, as compared with fathers or their ancestors of some years ago. The system of education had made wonderful strides during the last twenty years, and even during the last ten years. Many boys now had the advantage of the secondary course, which they would not have had the remotest chance of getting twenty years ago. The boys should appreciate that, and, when the time came for them to choose a career, they should remember that this State was developing, and would become great. They should endeavour to visualise the future of what Queensland would be, and should not take a course of study which might lead them to professions already overcrowded. Any boy who had ambition and desired achievement, would have great possibilities in the vast extent of Queensland's resources. The policy of every Government would include advancement in education and science. The fact that there were hundreds of thousands of square miles in this State ought to instil in youth a great inspiration to go ahead and make the country a rich nation."

Ratoon Cotton.

Mr. B. Crompton Wood, chairman of the British Cotton Delegation, made the following statement on leaving South Australia:—

"A good deal has been written lately in the Press about growing cotton on the ratoon principle—that is, leaving the plant in the ground from year to year, instead of sowing annually. In face of the importance to the industry of this question, I should like to state some of the reasons that have lead us to condemn this system.

"All authorities who have ever had anything to do with manufacturing cotton agree that the fibre of cotton grown under ratoon methods deteriorates year by year, both in the strength and the regularity of the staple, the former resulting in weak yarn, the latter in greater waste in the process of spinning. Hence, ratoon cotton is not admitted in the Cotton Exchanges of the world as good, sound cotton. In addition to this, there can be no question that the system of ratooning increases the insect pests, which are so destructive to cotton, by affording a natural harbourage for them from year to year.

"So serious is this considered in Egypt that legislation has been passed enforcing the destruction of all cotton shrubs by fire at the end of each season. A similar law is not necessary in the United States where most cotton-growing areas are subject to heavy frosts, which, by killing the plant, prevent any question of ratooning, but in the few areas where frost does not occur, ratoon cotton is not grown, and the Department of Agriculture strongly condemn this method of culture.

"It must, therefore, be obvious that cotton grown under the ratoon system does not conduce to the production of the highest qualities of cotton, and so tends to imperil the success of the industry.

"In addition, as cotton growers in Australia are very favoured by the high price guaranteed to them by their Governments, the least they can do is to grow as good cotton as possible, so as to reduce the loss which almost certainly must be incurred by the community at large under these guarantees.

"Finally, to solve this question, tests are being made by the Australian Cotton Growing Association, who, subject to Government approval, are growing cotton from the same seed and in the same place, under both systems, so as to obtain exact data. I sincerely hope that until these experiments have proved otherwise, the practice, general in the world, of growing cotton annually shall be adopted in Australia.

"It must never be forgotten that in countries with cheap labour and low freights to the cotton spinning centres, it may pay to grow a third-rate quality of cotton, but this cannot apply to Australia."

Production, Prospects, and Prices.

The information set out hereunder has been abstracted from departmental summaries of market movements and weather conditions for the month of November. The value of a monthly journal as a vehicle for market information is obviously limited, and this review is merely a record of the month's conditions and marketings.

Weather and Crops.

The first week of November was hot and dry. In some of the maize areas, particularly the Lockyer, early sown crops were wilting. In the course of the week ended 11th November light showers were registered, fairly generally in the south-east corner. Light scattered showers were reported from other parts of the coast. beneficial falls were reported from various Downs centres, though generally dry weather was favouring harvesting operations. Above the Range maize planting was being deferred for a further splash of the needful.

In the course of the second week of the term light showers were experienced in areas adjacent to the metropolis. Cotton planting was, however, being delayed for heavier precipitation. Country reports showed that an exceptionally dry spring had been experienced; as a result markets were improving in tone.

Widely distributed rains were reported in the third week of the term. These were, however, of a light nature, and their chief benefits were as pasture refreshers. Theebine had the highest registration with 183 points. Gympie was favoured to the extent of 145 points. Other places with over an inch registration were Nanango, Gundiah, Emu Vale, Stanthorpe, and Laidley. Good soaking rain was required to start the main new season's cotton planting and bring along the young plants already above ground.

Further useful showers were reported in the following week from the South Coastal, Carpentaria, and Central districts; thunderstorms were reported from some parts of the West. A good general fall was still an outstanding need. Temperatures were high.

The Markets.

Product.	Week ended 4th November.	Week ended 11th November.	Week ended 18th November.	Week ended 25th November.
Lucerne chaff. .	6s. 9d. to 12s. 10d.	Prime to 11s. 6d.; Other grades, to 9s.	Prime, 8s. 4d. to 11s. 4d.	Prime to 10s.; Inferior, 5s. 3d. to 7s.
Oaten chaff ..	Border, 7s. 6d. to 9s. 9d.; Local, 4s. 6d. to 8s. 3d.	8s. to 10s. 3d. ..	Border, 8s. to 10s.; Local to 8s. 3d.	Border to 11s.; Local to 10s.
Mixed chaff ..	7s. 4d. to 9s. 7d.	7s. to 10s. 4d. ..	4s. 3d. to 10s. ..	9s.
Maize	5s. 2½d. to 5s. 4½d.	5s. 2½d. to 5s. 3½d.	5s. 5d. to 6s. 1½d.	6s. 2d.
Potatoes ..	11s. to 18s. 2d.	7s. 6d. to 16s. ..	10s. to 20s. 6d.	11s. to 18s. 6d.
Sweet potatoes	6s. to 7s. 6d. ..	7s. to 8s. ..	7s. 9d.	Market bare
Pumpkins ..	4s. 6d. to 8s. 3d.	11s. 6d.	6s. 6d. to 14s. ..	13s. 6d.
Wheat (feed) ..	5s. 7½d. to 6s. 5d.	6s. 4½d. to 6s. 6d.	5s. 6d. to 6s. 4d.	6s. 3d.
Barley	None offering ..	Bare	5s. (skinless) ..	4s. 4d. to 4s. 5d.
Broom millet ..	£40 to £50 ..	Unchanged ..	Unchanged ..	Unchanged

General Notes.

An Effective Rat Poison.

In an article in the current number of the "Quarterly Review" on "Education for Farmers," the statement is made that the rat population on the farms in England eat more food than would pay for all the agricultural education of the country, and on a scale undreamt of at present. The writer points out that a mixture of carbonate of barium and red squills, placed in a suitable medium, is death to rats, but will not harm a chicken. Poultry-keepers should make a note of the mixture and use it to exterminate the rats. Most chemists sell the mixture ready for use.

Red squills are only successful when obtainable in a fresh state, which is said to be not possible in Australia. Carbonate of barium is an effective poison used as follows:—Carbonate of barium, 8 oz.; oatmeal, 16 oz.; beef dripping or tallow, 8 oz.; salt, $\frac{1}{2}$ oz. Knead this mixture into a dough, cut into $\frac{1}{2}$ -inch cubes, and place near rat holes. This mixture is not considered dangerous to domestic animals or human life.

Arrowroot Pool Board.

The ballot taken by arrowroot growers for the purpose of selecting a board to control the Arrowroot Pool formed recently resulted as follows:—Messrs. Alex. Clark, Thos. Doherty, Alex. McG. Henderson, Johannes Lahrs, and J. F. W. Sultmann.

Wheat Pool Board.

The Wheat Board election results are as follows:—Messrs. F. J. Morgan, Robt. Swan, J. T. Chamberlin, B. C. C. Kirkegaard, A. J. Harvey, and Thos. Muir.

Meat Industry Advisory Board.

The gentlemen listed as follows have been elected to the Meat Industry Advisory Board:—Messrs. E. T. Bell, M.L.A., J. L. Wilson, R. C. Philp, T. Snelling, R. H. Edkins, W. P. Shaw, A. S. Drewe, W. H. Austin, R. Grant, and C. H. Sagar.

Development of Cotton Growing—Appointment of Director of Cotton Culture

A recent cablegram announced that Colonel G. Evans, lately Director of Agriculture in Bengal, has been selected by the Empire Cotton Growing Corporation, at the instance of the Queensland Government, to advise on the development of cotton growing in this State. In the course of a Press interview, the Premier (Hon. E. G. Theodore) said that Colonel Evans had been selected for the Queensland Government, and would occupy the position of director of cotton culture. He would be accompanied by a staff of assistants, also selected by the Corporation or by Colonel Evans. The Director of Cotton Culture and his staff would be appointed to their respective positions by the Queensland Government, but for the first two years their salaries would be paid by the Empire Cotton Growing Corporation, which, it would be remembered, had received a subsidy of £1,000,000 from the British Government for the purpose of encouraging the production of cotton within the Empire. At the expiration of the term of two years, the Queensland Government would make direct arrangements with Colonel Evans.

Answers to Correspondents.

Trees Suitable for Planting in the Bell District.

C. F. (Bell)—

The Government Botanist (Mr. C. T. White, F.L.S.) advises:—

Tamarind trees are not likely to do well, or, in fact, even to grow at Bell; this tree wants a rather moist tropical or sub-tropical climate.

Coral Trees of certain species (e.g., *Erythrina caffra*) might be worthy of trial. The flowering Gums (*Eucalyptus ficifolia* and *Eucalyptus calophylla*) do not as a general rule thrive well in Queensland, and it is better to only plant a few trees as a trial than a large number, though they are likely to succeed better at Bell than on the coast.

The trees listed as follows are likely to succeed, and should be all obtainable from Brisbane or Toowoomba nurserymen:—

- Pittosporum undulatum* (Pittosporum).
- Sterculia diversifolia* (Kurrajong).
- Sterculia rupestris* (Bottle tree).
- Sterculia trichosiphon* (Broad-leaved bottle tree).
- Schinus molle* (Pépper or pepperina tree).
- Schinus terebinthifolius* (Broad-leaved pepper tree).
- Acacia podalyriæfolia* (Queensland silver wattle).
- Bauhinia Hookeri* (Native Bauhinia tree).
- Albizzia lebbek* (Albizzia or "acacia tree").
- Melia composita* (White cedar).
- Eucalyptus* spp. (Gum trees).
- Celtis australis* (Portugese elm).
- Grevillea robusta* (Silky oak).
- Platanus occidentalis* (Plane tree).
- Pinus* spp. (Pines).

The Use of Lime in the Stanthorpe District.

M. E. S. (Applethorpe), writes:—

Enclosed please find two Press cuttings* which have recently appeared in our local paper. At present the Fruitgrowers' District Council are taking steps with a view to obtaining large quantities of lime at cheaper rates, but after reading these articles, many growers are beginning to doubt the wisdom of such steps.

Will you kindly advise us on this matter. If you still advocate lime, kindly state—

- (1) Whether burnt or pulverised?
- (2) What quantities to be used, annually or otherwise?
- (3) Most suitable time to apply same?
- (4) Would it benefit where no green crop is grown?

Green crops suitable to grow here in winter are barley and peas (grey or dun), and melilotus clover.

Thanking you in anticipation.

* (1) Report of lecture upon the "Use of Lime on Soil," by Mr. H. Wenholz, N.S.W. Dept. of Agric., before the Agricultural Section of the Royal Society, Sydney.

(2) Letter by Mr. James Henderson, Stanthorpe, to "The Border Post."

On the letter and the Press cuttings the Agricultural Chemist (Mr. J. C. Brünnich) comments as follows:—

“The remarks made by Mr. Henderson contain a good deal of truth, and of course any application of some 6 tons of lime would be madness. With regard to the lecture delivered by Mr. Wenholz, of which an extract appeared in the ‘Border Post,’ it must be pointed out that the lecture does not apply to our fruitgrowing areas, but rather to general agriculture. The remarks made by Dr. Hall on the necessity of liming are perfectly correct, but apply to the intense cultivation practised in Europe.

“In order to study the lime requirements of our Stanthorpe granitic soils, the whole composition of the soil must be taken into consideration, and we find that although the actual amounts of plant foods are low, as compared with those found in our rich agricultural lands, they are well balanced and supported by an excellent physical condition of the soil, which encourages an exceptionally fine root development, and makes therefore the small amounts go much further.

“The average of 11 types of soil analysed was found to contain per acre to 12 inches depth—

Lime:	..	Total 4,270 lb.	Readily available 1,437 lb.
Phosphoric Acid:	Total 2,546 lb.	Readily available	197 lb.
Potash:	..	Total 2,423 lb.	Readily available 287 lb.
Nitrogen:	..	Total 1,355 lb.	—

adding lime to soils of this composition would be of little or no benefit to fruit trees, but quickly growing crops, like green manure crops, vegetables, &c., would undoubtedly be benefited, more particularly if other fertilisers, particularly those containing nitrogen and phoric acid, would be applied at the same time.

“Farmers often make the mistake in thinking and expecting that an application of lime alone will cure all evils and will replace the use of other fertilisers or even of thorough cultivation.

“The theoretical opinion so frequently expressed to use quick lime for heavy clayey soils, and to use pulverised limestone for light sandy soils, is quite correct, but should not be taken literally when applied to the light dressings of lime now made every 2 or 3 years, on account of the high cost of lime.

“When half a ton of quick lime is applied broadcast to an acre of ground after being air slaked, in a very short time the bulk of it will have changed into carbonate of lime, but still the action on the soil would be very quick by the slight amount of lime immediately dissolved by rain and dew, whereas when applying the equivalent amount of lime in form of one ton of pulverised limestone the action would be very slow, and perhaps not noticeable the first season.

“Therefore use lime in its cheapest form, which is burnt lime, apply at the rate of half a ton per acre, every 2 or 3 years, before the planting of green manures, and do not neglect the use of artificial fertilisers, and farmyard manure, and compost if available.”

“Fish Poison Vine” (*Derris Uliginosa*).

J. C. (Mibu Estate, Daru, Papua) writes:—

By this post I am sending you, under separate cover, the leaves, stem, and root of a vine, the roots are used by the natives here to stupefy fish with, and as we planters buy a lot of this fish to eat, we should be much obliged if you could tell us the poison it contains, and if it could be purchased and used for the same purpose.

The root in the package is the part that has a piece of the vine twisted round it, the natives only use the root, and beat it up to a pulp, and then squeeze it into still pools, presently the fish come up belly up, and are easily caught. The native name for the vine is “Sardie.” I can’t procure a flower or berry. They are propagated by slips. Thanking you in advance.

The Government Botanist (Mr. C. T. White, F.L.S.) comments as follows:—

“It bears no flowers or pods, but is evidently *Derris uliginosa*, a plant used considerably in New Guinea, Asia, North Australia, and the Pacific Islands as a fish poison. In New Guinea it goes under the name of “Dynamite Plant” from this fact.

"The poisonous principle is a resin isolated by the late Dr. Greshoff, a famous plant chemist, at one time Director of the Botanic Gardens, Buitenzorg, Java. The isolated resin cannot, I believe, be purchased, but the root of an allied species, *Derris elliptica*, is an article of export from Singapore, where it is known as Tuba roots.

"Derris roots and stems are a commercial product, and during the last few years have been largely used as the basis for many commercial insecticides. I have before mentioned the fact that the collecting of 'Sardie' stems and roots should be made a rather profitable native industry. What do you think of the probabilities of this?"

Dividing Fences.

R. P. H. (Yangan)—

(1) If you are in doubt about the line, you should employ a surveyor to determine the actual boundary, and if you decide to do so, you should give due notice to your neighbour of same.

(2) and (3) A dividing fence is sufficient if it keeps cattle back.

(4) If your neighbour's cattle trespass on your land, they can be impounded if the land is fenced, and there is no need to wait three months. If it is unfenced, you had better consult your solicitor before taking any action.

(5) Being unaware of local circumstances, you are advised to consult your solicitor.

The Cultivation of Newly Cleared Land.

S. Bale (Petrie)—

The Director of Agriculture, Mr. H. C. Quodling, replies to your queries as follows:—

"Land which has been previously covered with dense undergrowth requires different treatment to that where the timber has been ringbarked as in your case. Owing to the fact of the ringbarking, the soil is to a certain extent sweetened, and following on the removal of the timber is available for almost immediate cultivation. Virgin land, however, is always improved by being turned with the plough and exposed to atmospheric influences to sweeten it. No crops should be planted within the area covered by the limbs of any green tree, and if possible this radius should be increased to at least 50 per cent.

"Among crops which do well on new land may be mentioned potatoes, oats, and rape, but even with these a certain amount of variation is necessary.

"Liquid manure is usually utilised for the purpose of stimulating plants which require rapid growth, but should not be used too strong. For your purpose it is considered that half a three-bushel bag of well-rotted farm manure should be steeped in a cask of not less than 20 gallons of water. This should be used in the proportion of one gallon to six, and should never be applied to plants, under dry conditions, but should follow the application of pure water. Certain timbers contain a higher percentage of potash than others, but as a general rule wood ashes are all more or less of value as a fertiliser, as will be noticed where old stumps have been burnt out.

"You mention that your country is covered with lantana, red oak, silver wattle, &c. Where lantana is growing the land is improved somewhat by the root system of the lantana, also by the amount of leafy matter (humus) it returns to the soil.

"Farm yard manure is improved somewhat by mixture with wood ashes. The mixture should be applied immediately to the land. Owing, however, to the inclusion of slight quantities of carbonate of lime in ashes, these, when used on exposed farm yard manure, are likely to liberate a small portion of the ammonia contained therein.

"This Department issues a publication entitled 'Market Gardening,' which will be forwarded to you on receipt of 1s. This publication contains an amount of information which will be valuable to a new settler."

Disease among Fowls.

F. S. (Curra L.P.A.) writes:—

(1) Can you tell me the cause of fowls—laying hens—dropping dead from their roosts during the night. The fowls are weighty and healthy, and well fed on wheat and peas. We can find no trace of any animal causing the damage, neither, when we open the fowls, can we see the cause of death?

(2) About ten years ago the Agricultural Chemist compiled a table of "The Manurial Requirements of Plants per Acre," which was published in the "Journal." I had it pasted on cardboard, but I now find the vermin have eaten it away. Can you publish the same table again? It is exceedingly useful to fruitgrowers.

The Poultry Instructor (Mr. J. Beard) comments:—

(1) It is very difficult for me to diagnose the trouble the fowls are suffering from owing to the limited explanation given. The correspondent omits to explain the nature, substance, and colour of the excreta, which is my best guide. If the excreta is of a bilious nature, the fowls are suffering from enteritis.

Quarantine affected birds, clean thoroughly and disinfect the house and run. Give each affected bird two teaspoonfuls of castor oil. Two hours after give 10 drops of chlorodyne in bread in the form of a pill; should the excreta not harden in from six to eight hours, give another five drops. Give scalded milk to drink.

(2) Yes.

To Correspondents.

Correspondents seeking information through the Journal should address all communications to the Under Secretary, Department of Agriculture and Stock, Brisbane. Letters on official matters should not be addressed personally to the Editor, who may be away from Headquarters on official duty at the time of their delivery; so to ensure prompt acknowledgment all technical inquiries should be directed, as suggested, to the Under Secretary.

Farm and Garden Notes for January.

FIELD.—The main business of the field during this month will be ploughing and preparing the land for the potato and other future crops, and keeping all growing crops clean. Great care must be exercised in the selection of seed potatoes to ensure their not being affected by the Irish blight. Never allow weeds to seed. This may be unavoidable in the event of long-continued heavy rains, but every effort should be made to prevent the weeds coming to maturity. A little maize may still be sown for a late crop. Sow sorghum, imphee, Cape barley, vetches, panicum, teosinte, rye, and cowpeas. In some very early localities potatoes may be sown, but there is considerable risk in sowing during this month, and it may be looked upon merely as an experiment. Plant potatoes whole. Early-sown cotton will be in bloom.

As the wet season is expected to commence this month, provision should be made accordingly.

On coastal and intercoastal scrub districts, where recently burnt-off scrub lands are ready for the reception of seed of summer-growing grasses, sowing may commence as soon as suitable weather is experienced. Much disappointment may be saved, and subsequent expenditure obviated, by ensuring that only good germinable grass seed is sown, of kinds and in quantities to suit local conditions, the circumstance being kept in mind that a good stand of grass is the principal factor in keeping down weeds and undergrowth.

In all districts where wheat, barley, oats, canary seed, and similar crops have recently been harvested, the practice of breaking up the surface soil on the cropped areas should invariably be adopted. Soil put into fit condition in this way will "trap" moisture and admit of the rains percolating into the subsoil, where the moisture necessary for the production of a succeeding crop can be held, provided attention is given to the maintenance of a surface mulch, and to the removal, by regular cultivation, of volunteer growths of all kinds. If not already seen to, all harvesting machinery should be put under cover, overhauled, and the woodwork painted where required.

Where maize and all summer-growing "hoed" crops are not too far advanced for the purpose, they should be kept in a well-cultivated condition with the horse hoe. Young maize and sorghum crops will derive much benefit by harrowing them, in the same direction as the rows are running, using light lever harrows with the tynes set back at an angle to obviate dragging out of plants, but the work should not be done in the heat of the day.

Quick-maturing varieties of maize and sorghum may still be sown in the early part of the month in coastal areas where early frosts are not expected.

Succession sowings may be made of a number of quick-growing summer fodder crops—Sudan grass, Japanese and French millet, white panicum, and liberty millet (panicum). In favourable situations, both "grain" and "saccharine" sorghums may still be sown; also maize, for fodder purposes.

Fodder conservation should be the aim of everyone who derives a living from stock, particularly the dairyman; the present is an important period to plan cropping arrangements. Exclusive of the main crops for feeding-off (when fodder is suitable for this purpose), ample provision should be made for ensilage crops to be conserved in silo or stack. As natural and summer-growing artificial grasses may be expected to lose some of their succulence in autumn, and more of it in winter and early spring, the cropping "lay-out" to provide a continuity of succulent green fodder throughout the season calls for thorough and deep cultivation and the building up of the fertility and moisture-holding capacity of the soil. Planter's friend (sorghum) may be sown as a broadcast crop at the latter end of the month for cutting and feeding to cattle in the autumn and early winter. Strips of land should be prepared also for a succession sowing about the second week in February, and for winter-growing fodder crops.

KITCHEN GARDEN.—A first sowing of cabbages, cauliflower, and Brussels sprouts may now be made in a covered seed bed, which must be well watered and carefully protected from insect pests. Sow in narrow shallow drills; they will thus grow more sturdy, and will be easier to transplant than if they were sown broadcast. The main points to be attended to in this early sowing are shading and watering.

Give the beds a good soaking every evening. Mulching and a slight dressing of salt will be found of great benefit. Mulch may consist of stable litter, straw, grass, or dead leaves. Dig over all unoccupied land, and turn under all green refuse, as this forms a valuable manure. Turn over the heavy land, breaking the lumps roughly to improve the texture of the soil by exposure to the sun, wind, and rain. In favourable weather, sow French beans, cress, cauliflower, mustard, cabbage, celery, radish for autumn and winter use. Sow celery in shallow well-drained boxes or in small beds, which must be shaded till the plants are well up. Parsley may be sown in the same manner. Turnips, carrots, peas, and endive may also be sown, as well as a few cucumber and melon seeds for a late crop. The latter are, however, unlikely to succeed except in very favourable situations. Transplant any cabbages or cauliflowers which may be ready. We do not, however, advise such early planting of these vegetables, because the fly is most troublesome in February. For preference, we should defer sowing until March. Still, as "the early bird catches the worm," it is advisable to try and be first in the field with all vegetables, as prices then rule high. Cucumbers, melons, and marrows will be in full bearing, and all fruit as it ripens should be gathered, whether wanted or not, as the productiveness of the vines is decreased by the ripe fruit being left on them. Gather herbs for drying; also garlic, onions, and eschalots as the tops die down.

FLOWER GARDEN.—To make the flower-beds gay and attractive during the autumn and winter months is not a matter of great difficulty. Prepare a few shallow boxes. boxes with the compost; then sow thinly the seeds of annuals. Keep the surface of the soil moist, and when the young seedlings are large enough to handle lift them gently one by one with a knife or a zinc label—*never pull them up by hand*, as, by so doing, the tender rootlets are broken, and little soil will adhere to the roots. Then prick them out into beds or boxes of very light soil containing plenty of leaf mould. Keep a sharp lookout for slugs and caterpillars.

All kinds of shrubby plants may be propagated by cuttings. Thus, pelargoniums, crotons, coleus, and many kinds of tropical foliage plants can be obtained from cuttings made this month. After putting out cuttings in a propagating frame, shade them with a piece of calico stretched over it. Be careful not to over-water at this season. Propagate verbenas, not forgetting to include the large scarlet Fox-hunter. Verbenas require rich soil. Palms may be planted out this month. If the weather prove dry, shade all trees planted out. With seed-boxes, mulch, shade, water, and kerosene spray, all of which imply a certain amount of morning and evening work, the flower garden in autumn and winter will present a charming sight.

Orchard Notes for January.

THE COASTAL DISTRICTS.

All orchards, plantations, and vineyards should be kept well cultivated and free from weed growth; in the first place, to conserve the moisture in the soil, so necessary for the proper development of all fruit trees and vines; and, secondly, to have any weed growth well in hand before the wet season commences. This advice is especially applicable to citrus orchards, which frequently suffer from lack of moisture at this period of the year if the weather is at all dry, and the young crop of fruit on the trees is injured to a greater or less extent in consequence.

Pineapple plantations must also be kept well worked and free from weeds, as when the harvesting of the main summer crop takes place later on, there is little time to devote to cultivation. If this important work has been neglected, not only does the actual crop of fruit on the plants suffer, but the plants themselves receive a setback.

Banana plantations should be kept well worked, and where the soil is likely to wash badly, or there is a deficiency of humus, a green crop for manuring may be planted. Should the normal wet season set in, it will then soon cover the ground without injury to the banana plants. When necessary, banana plantations should be

manured now, using a complete manure rich in potash and nitrogen. Pineapples may also be manured, using a composition rich in potash and nitrogen, but containing no acid phosphate (superphosphate) and only a small percentage of bone meal, ground phosphatic rock, or other material containing phosphoric acid in a slowly available form.

Bananas and pineapples may still be planted, though it is somewhat late for the former in the more Southern parts of the State. Keep a good lookout for pests of all kinds, such as Maori on citrus trees, scale insects of all kinds, all leaf-eating insects, borers, and fungus pests generally, using the remedies recommended in Departmental publications.

Fruit-fly should receive special attention, and on no account should infested fruit of any kind be allowed to lie about on the ground to become the means of breeding this serious pest. If this is neglected, when the main mango crop in the South and the early ripening citrus fruits are ready, there will be an army of flies waiting to destroy them.

Be very careful in the handling and marketing of all kinds of fruit, as it soon spoils in hot weather, even when given the most careful treatment. Further, as during January there is generally more or less of a glut of fresh fruit; only the best will meet with a ready sale at a satisfactory price.

Grapes are in full season, both in the Brisbane and Coominya districts, and in order that they may be sold to advantage they must be very carefully handled, graded, and packed, as their value depends very much on the condition in which they reach the market and open up for sale. Well-coloured fruit, with the bloom on and without a blemish, always sells well, whereas badly coloured, immature, or bruised fruit is hard to quit.

One of the greatest mistakes in marketing grapes is to send the fruit to market before it is properly ripe, and there is no better way to spoil its sale than to try and force it on the general public when it is sour and unfit to eat.

Bananas for sending to the Southern States require to be cut on the green side, but not when they are so immature as to be only partially filled. The fruit must be well filled but show no sign of ripening; it must be carefully graded and packed and forwarded to its destination with as little delay as possible.

Pineapples should be packed when they are fully developed and the base pips are beginning to show the first trace of colour. Immature fruit must not be sent. For canning, the fruit should be partly coloured; immature fruit is useless; and over-ripe fruit is just as bad. The former is deficient in colour and flavour and the latter is "winey" and of poor texture, so that it will not stand the necessary preparation and cooking.

Should there be a glut of bananas, growers are advised to try and convert any thoroughly ripe fruit into banana figs.

The fruit must be thoroughly ripe, so that it will peel easily, and it should be laid in a single layer on wooden trays and placed in the sun to dry. If the weather is settled, there is little trouble, but if there is any sign of rain the trays must be stacked till the weather is again fine, and the top of the stack protected from the rain. To facilitate drying, the fruit may be cut in half lengthways. It should be dried till a small portion rubbed between the finger and thumb shows no sign of moisture. It can be placed in a suitable box to sweat for a few days, after which it can be dipped in boiling water to destroy any moth or insect eggs that may have been laid on it during the process of drying and sweating. It is then placed in the sun to dry off any moisture, and when quite dry it should be at once packed into tight boxes lined with clean white paper. It must be firmly packed, when, if it has been properly dried, it will keep a considerable time. It can be used in many ways, and forms an excellent substitute for raisins, sultanas, currants, or other dried fruits used in making fruit cakes and other comestibles. Banana figs will be found useful for home consumption, and it is possible that a trade may be built up that will absorb a quantity of fruit that would otherwise go to waste.

THE GRANITE BELT, SOUTHERN AND CENTRAL TABLELANDS.

January is a busy month in the Granite Belt, and orchardists are fully occupied gathering, packing, and marketing the crop of midseason fruits, consisting of plums of several kinds, peaches, nectarines, pears, and apples. The majority of these fruits are better keepers and carriers than those that ripen earlier in the season; at the same time, the period of usefulness of any particular fruit is very limited, and it must be marketed and disposed of with as little delay as possible.

The advice given in the Notes for December, to send nothing but first-class fruit to market, still holds good. With the great increase in production, owing to the large area of new orchards coming into bearing and the increasing yields of those orchards that have not come into full profit, there is not likely to be any market for immature or inferior fruit. There will be ample good fruit to fully supply the markets that are available and accessible. Much of the fruit will not carry much beyond the metropolitan market, but firm-fleshed plums, clingstone peaches, and good, firm apples should stand the journey to the Central, and, if they are very carefully selected, handled in a manner to prevent any bruising, and properly graded and packed, they should carry as far as Townsville. Growers must remember that, given a market fully supplied with fruit, only such fruit as reaches that market in first-class condition, is likely to bring a price that will pay them; consequently the grower who takes the trouble to send nothing but perfect fruit, to grade it for size and colour, to pack it carefully and honestly, placing only one sized fruit, of even quality and even colour, in a case, and packing it so that it will carry without bruising, and, when opened up for sale, will show off to the best advantage, is pretty certain of making good. On the other hand, the careless grower who sends inferior, badly graded, or badly packed fruit is very likely to find, when the returns for the sale of his fruit are to hand, that after paying expenses there is little, if anything, left. The expense of marketing the fruit is practically the same in both cases.

Then "why spoil the ship for the ha'p'orth of tar" after you have gone to the expense of pruning, spraying, manuring, and cultivating your orchard? Why not try and get a maximum return for your labour by marketing your fruit properly? The packing of all kinds of fruit is a fairly simple matter, provided you will remember—

- (1) That the fruit must be fully developed, but yet quite firm when gathered.
- (2) That it must be handled like eggs, as a bruised fruit is a spoilt fruit, and, when packed with sound fruit, spoils them also.
- (3) That only one-sized fruit, of an even degree of ripeness and colour, must be packed in a case.
- (4) That the fruit must be so packed that it will not shift, for if it is loosely packed it will be so bruised when it reaches its destination that it will be of little value. At the same time, it must not be packed so tightly as to crush the fruit.

If these simple rules are borne in mind, growers will find that much of the blame they frequently attribute to the fruit merchants or middlemen is actually the result of their own lack of care. Fruit that opens up in the pink of condition sells itself, whereas any fruit that opens up indifferently is hard to sell on any except a bare market, and on a glutted market is either unsaleable or realises such a poor price that the grower is frequently out of pocket and would have been better off had he not attempted to market it.

If spraying with arsenate of lead, and systematic bandaging, has been properly carried out, there will be comparatively few codlin moths to destroy the later ripening pip fruits; but if these essential operations have been neglected or carelessly carried out, a number of moths will hatch out and the eggs laid by them will turn to larvæ that will do much damage, in some cases even more than that caused by the first broods that attack the fruit as soon as it is formed. Where there is any likelihood, therefore, of a late crop of moths, spraying with arsenate of lead must be continued if the late crop of pip fruits is to be kept free from this serious pest.

Fruit-fly must be systematically fought, and on no account must any fly-infected fruit be allowed to lie about on the ground and breed this pest, to do further damage to the later ripening fruits.

Citrus orchards will need to be kept well cultivated in the drier and warmer parts of the State, and, where necessary, the trees should be irrigated. If scale insects are present, the trees should be either sprayed, or, better still, treated with hydrocyanic acid gas.

Western grapes are in full season, and if they are to be sent long distances by rail, then they are all the better to be cut some hours before they are packed, as this tends to wilt the stems and keep the berries from falling off in transit. The fruit must be perfectly dry when packed, and should be as cool as possible. It must be firmly packed, as a slack-packed case always carries badly and the fruit opens up in a more or less bruised condition.

ASTRONOMICAL DATA FOR QUEENSLAND.

Times Computed by D. EGLINTON, F.R.A.S.

TIMES OF SUNRISE AND SUNSET.

AT WARWICK.

1922.	OCTOBER.		NOVEMBER.		DECEMBER.	
Date.	Rises.	Sets.	Rises.	Sets.	Rises.	Sets.
1	5.34	5.50	5.4	6.8	4.50	6.32
2	5.33	5.51	5.3	6.9	4.50	6.33
3	5.32	5.52	5.3	6.9	4.50	6.34
4	5.31	5.52	5.2	6.10	4.50	6.35
5	5.29	5.53	5.1	6.11	4.50	6.36
6	5.28	5.53	5.0	6.12	4.51	6.36
7	5.27	5.54	5.0	6.12	4.51	6.37
8	5.25	5.54	4.59	6.13	4.51	6.38
9	5.24	5.55	4.59	6.14	4.51	6.38
10	5.23	5.55	4.58	6.15	4.51	6.39
11	5.22	5.56	4.57	6.16	4.52	6.39
12	5.21	5.56	4.57	6.16	4.52	6.40
13	5.20	5.57	4.56	6.17	4.52	6.40
14	5.19	5.57	4.56	6.18	4.52	6.41
15	5.18	5.58	4.55	6.19	4.53	6.41
16	5.17	5.59	4.55	6.20	4.53	6.42
17	5.16	5.59	4.54	6.20	4.53	6.43
18	5.15	6.0	4.54	6.21	4.54	6.44
19	5.14	6.0	4.53	6.22	4.54	6.45
20	5.13	6.1	4.53	6.23	4.55	6.45
21	5.12	6.2	4.53	6.24	4.55	6.46
22	5.11	6.2	4.52	6.24	4.56	6.46
23	5.10	6.3	4.52	6.25	4.56	6.46
24	5.9	6.3	4.51	6.26	4.57	6.47
25	5.8	6.4	4.51	6.27	4.57	6.47
26	5.8	6.5	4.51	6.28	4.58	6.47
27	5.7	6.6	4.50	6.28	4.59	6.48
28	5.6	6.6	4.50	6.29	5.0	6.48
29	5.5	6.7	4.50	6.30	5.0	6.49
30	5.5	6.7	4.50	6.31	5.1	6.49
31	5.4	6.8	...	...	5.1	6.49

PHASES OF THE MOON, OCCULTATIONS, &c

The times stated are for Queensland, New South Wales, Victoria, and Tasmania when "Summer" Time is not used.

6 Oct. ○ Full Moon 10 58 a.m.
 14 ") Last Quarter 7 55 a.m.
 20 " ● New Moon 11 40 p.m.
 27 " (First Quarter 11 26 p.m.

Apogee on 5th at 6 a.m.

Perigee on 20th at 2.42 a.m.

An occultation of Delta Tauri will take place on 10th October about a quarter past 9. With binoculars or a small telescope this will be an interesting sight as the Moon will be in the group of stars called the Hyades of which Aldebaran is the principal star.

5 Nov. ○ Full Moon 4 36 a.m.
 12 ") Last Quarter 5 52 p.m.
 19 " ● New Moon 10 6 a.m.
 26 " (First Quarter 6 15 p.m.

Perigee on the 17th at 10.6 a.m.

Apogee on the 29th at 5.24 a.m.

Delta Tauri will again be occulted about 3 a.m. on the 7th; also Eta Virginis on the 15th about 9.30 p.m.; and the planet Saturn on the 16th about 5 p.m. when the Moon and it are far below the horizon.

4 Dec. ○ Full Moon 9 24 p.m.
 12 ") Last Quarter 2 41 a.m.
 18 " ● New Moon 10 20 p.m.
 26 " (First Quarter 3 53 p.m.

Perigee on 15th at 1.30 a.m.

Apogee on 27th at 2.6 a.m.

Delta Tauri will be occulted about 10 a.m. on the 4th, when the Moon and star are below the horizon, but on the 31st, when it will be occulted about the time of sunset, an interesting observation of the star's reappearance may be possible in the twilight.

For places west of Warwick and nearly in the same latitude, 28 degrees 12 minutes S., add 4 minutes for each degree of longitude. For example, at Inglewood, add 4 minutes to the times given above for Warwick; at Goondiwindi, add 8 minutes; at St. George, 14 minutes; at Cunnamulla, 25 minutes; at Thargomindah, 33 minutes; and at Oontoo, 43 minutes.

The moonlight nights for each month can best be ascertained by noticing the dates when the moon will be in the first quarter, and when full. In the latter case the moon will rise somewhat about the time the sun sets, and the moonlight then extends all through the night; when at the first quarter the moon rises somewhere about six hours before the sun sets, and it is moonlight only till about midnight. After full moon it will be later each evening before it rises, and when in the last quarter it will not generally rise till after midnight.

It must be remembered that the times referred to are only roughly approximate, as the relative positions of the sun and moon vary considerably.

[All the particulars on this page were computed for this Journal, and should not be reproduced without acknowledgment.]



Power for All Farm Work

There are many other uses for a good tractor on your farm besides plowing. The tractor that is not equally serviceable for belt work as for drawbar work is only half a tractor. You may not realise it now, but you will find, as others have, after running their tractor a short time, that fully half of its service will be on belt work.

In designing the Titan 10-20 kerosene tractor, its adaptability to belt work has been given just as much consideration as its service at the drawbar. The belt pulley is attached directly to the engine crank shaft. There are no gears through which the power must be transmitted, but all the power of the engine is available at the belt. The belt pulley is on the right-hand side of the tractor, just in front of the drive wheels. You can back into the belt of the machine to be driven and see along it without leaving your position on the seat of the tractor.

The Titan 10-20 is equipped with a large-diameter, broad-faced friction clutch pulley. This makes it possible to start the tractor without starting the pulley, saving the necessity of removing the belt. You can stop the machine being driven without stopping the tractor. You can start slowly without a jerk or a strain on either the machine or tractor. In case a quick stop is necessary, you need not stop the engine and wait for the flywheel to come to rest. The clutch wheel can be pulled out and the machine brought to a standstill almost instantly.

These are important features that should not be overlooked in buying a tractor. You need them. Buy a Titan 10-20 and you will get them all.

International Harvester Company of Australia Pty. Ltd.

200 Roma Street, Brisbane

Agents Everywhere

—increase of 3 tons of cane per
acre for every hundredweight of

SULPHATE of AMMONIA

The Direct Fertilizer

(Extract from "Sydney Morning Herald," 13/1/22)

"Some time ago the Colonial Sugar Co. decided to carry out experiments on the Richmond with a view to discovering the most suitable manure for cane-growing lands. The result is now available and will be of particular interest to canegrowers in Queensland and New South Wales. The experimental crop was harvested on November 15/16 last, and the results were—

The four unmanured plots averaged 21 tons per acre, the four treated with 1 cwt. **SULPHATE OF AMMONIA** averaged 24.1 tons per acre, and the four plots treated with 2 cwts. averaged 27 tons per acre. Thus, for every hundredweight Sulphate of Ammonia applied, the increase was equal to 3 tons per acre—a most striking result. The manure in no way affected the quality of the cane, for the whole crop averaged 15.8 p.o.c.s."

*Obtain supplies from local distributor,
or the following producers:—*

THE AUSTRALIAN GAS-LIGHT CO.
Pitt, Barlow, and Parker Streets, Sydney

THE BROKEN HILL PTY. CO. LTD.
28 O'Connell Street, Sydney

THE NORTH SHORE GAS CO.
Alfred Street, North Sydney

The **Hafa-Hors**

PETROL MOTOR

Just the Size for the Little Jobs!

Weights only 65 lbs.

A REAL GOOD ENGINE, simple in design, safe, reliable, and strongly built—that's the "Hafa-Hors"—yet, it is a deal more than this, as it is the very engine specially made for those numerous little time-taking jobs that are just too small for the usual single engine and too scattered for the power plant.

SPECIFICATIONS—The "Hafa-Hors" Engine is of unusual design, and embodies many exclusive features of merit without departing from standard gasoline engine construction.

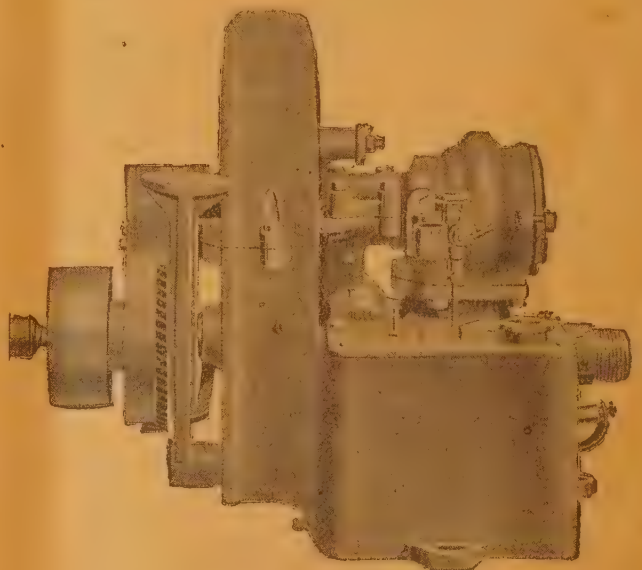
It is air-cooled, the fly-wheel flange directing a strong blast of air directly against and around the enclosed cylinder. The cylinder being inverted, gives ease in starting and positive lubrication. Overheating is absolutely impossible.

The governor is of the "hit and miss" type and sensitive enough for direct electric lighting. Speed changes easily made while engine is running.

Engine is equipped with combination starter and countershaft. Countershaft is driven at one-third crank-shaft speed by silent helical cut gears encased in a housing. Pulleys attached or detached in 10 seconds.

Crank shaft and connecting rod are drop forgings, properly heat treated, and crank shaft is fitted with high-grade annular ball bearings. Crank pin bearing is easily renewable.

Dimensions of Engine: 16 x 14 x 13½ inches. Bore and stroke, 2 inches, developing ½ horse power at 1,200 revolutions per minute. Shipping weight 90 lbs



PRICE:

£27 - 10 - 0

GUARANTEE

You need not hesitate in ordering a "Hafa-Hors" Engine, for it is fully guaranteed to give entire satisfaction, if directions are followed.

WILLIAM ADAMS & COMPANY LIMITED
corner Edward and Mary Streets, Brisbane

"BILL—cut us a bit of firewood before you go?"

Then it is 10 o'clock before you get to work.

Ever think of the tons of firewood you will have to cut in the future—and the time you lose at it?

Get in the shed on a wet day, and half a day cutting with a DIAL SAFETY FIREWOOD BENCH will give you a six months' supply. Here's the ONE "SAFE" FIREWOOD BENCH; you never work in front of the Saw.



Built strong and sturdy of seasoned hardwood. Stayed with nine iron tie rods, and given two coats of paint. Cuts curly, twisted, or straight logs easy and quick. Logs cannot roll or bind the saw. Table runs on roller bearings. A finger push moves the log to and from the saw. Solid steel spindle and special non-binding swivel bearings. Built to last a lifetime.

Priced very low considering the strength and kind of Bench it is.

	Cash in 30 days.	3 Months' Terms.	6 Months' Terms.
With 24 in. Saw fitted	£26	£27	£28
With 30 in. Saw fitted	£29	£30	£31

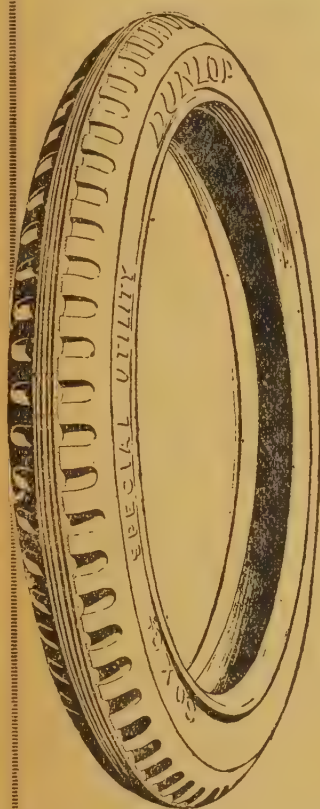
You will always want wood. Are you going to chop every bit for the rest of your life, and be called away from other work to do it, or will you improve your farm, make your work easier, and save hours every week, and use the wet days by taking 30 days' Free Trial with the DIAL SAFETY FIREWOOD BENCH. Can also be supplied with extra top complete with rollers and gauge for cutting any width board or stud. £10 extra.

IMMEDIATE DELIVERY—NO MONEY DOWN

LEWIS & CO. LTD. Next A. J. Gasworks,
West End, BRISBANE

“Utility” (30" x 3 $\frac{1}{2}$ ") Cover

This Dunlop Cover has been specially designed to meet the requirements of owners of the various light cars now on the road. It's a cover of ample weight and strength—to ensure many thousands of miles of running on such cars as the Ford, Overland, Chevrolet, Bean, etc. — whilst it incorporates the same high standard of materials and workmanship as our popular “Railroad”



DUNLOP TYRES

The "Utility" is easily the best value yet offered to light car owners — and as the

Covers retail at **94/6** ea.
Tubes „ **18/-** „

—it's a proposition well worth your consideration. Only made in the above size. May be obtained from all garages.

★ ★ ★

DUNLOP RUBBER CO, OF AUST. LTD.
ALL STATES AND N.Z.

Brisbane House:

268-74 Adelaide Street



Years of practice, expert teaching, and a mind that is musical and has been gifted by divine inspiration of music, combine to make fingers so sensitive that only the best Piano obtainable responds with the quick answering ring which makes for perfect Pianoforte playing. *The*

GAVEAU GRAND PIANO

is an instrument constructed upon the very best lines, is durable, handsome, and sweet toned, and is fully guaranteed to withstand the Australian climate successfully.

Catalogues Free

Write or Call to-day

Sole Agents—

Palings 86-88 Queen Street
BRISBANE

Toowoomba and Rockhampton

SOIL FERTILITY

is essential to

Increased Production

and one of the greatest factors in the maintenance or increase of Soil Fertility is the use of

Sulphide Fertilisers

There are

Special Sulphide Fertilisers for all Crops

The analysis of every bag of Sulphide Fertiliser is *guaranteed* under the *Queensland Fertiliser Act*.

Sulphide Fertilisers

are manufactured specially for Queensland crops grown under Queensland conditions of soil and climate.

Prices and all particulars may be obtained from—

Gibbs, Bright & Co.

Eagle Street, Brisbane

The Forster Engineering Works

SPEAKING OF REPAIRS?

We Specialise in Repairs of every description, particularly Machine-cut Gears in Iron, Steel, Gun Metal, Raw-hide, etc.

Horse and Cattle Brands made; also Ploughs and Ploughshares made and repaired. Inquiries for any class of Machinery will receive prompt and special attention.

Write for particulars.

Forster Engineering Works Ltd.

Engineers and Blacksmiths,

Mary Street (between George and Albert Streets), Brisbane.

FRUITGROWERS

Consign your Bananas and other Fruits, Poultry, etc., to

G. GALL

Roma St. Markets, Brisbane

Books open to inspection of Clients.

FOR SALE—Banana Leases.

Good Proposition, 7 to 15 acres, £230 to £550. Terms.

THE "New-Way"

RELEASER MILKER

Installed at half cost of other machines

And costs less than half to run

Satisfaction guaranteed

Dorroughby,

12th September, 1922

Sirs,

The NEW WAY Milking Machines with Releaser System installed by you last February have proved most satisfactory. Not only are they *excellent milkers* but are very sanitary, every part being easily and quickly cleaned.

They are *simplicity itself*, as is the Releaser System.

Besides all the foregoing the machines are cheap to run, as only a small engine is needed, and there are few parts that need replacing.

We can honestly recommend the NEW WAY Milking Machines with Releaser System to all farmers.

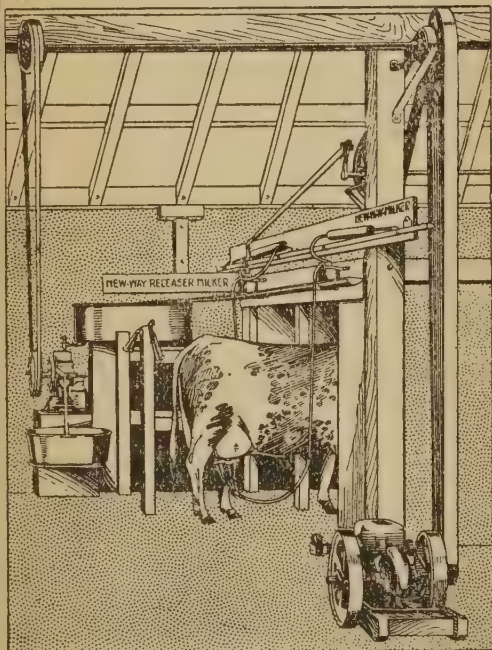
(Sgd.) SIMES BROS.

Agents—

W. A. PRESTON & CO.

Dairy Machinery Merchants

175-179 Albert Street - BRISBANE



New Way 2 unit Releaser Milker and Separating outfit.

Mr. Phil. Smith Enjoys a Rexona Shave



Mr. PHIL. SMITH (from a photo.)

What about me for a "Rexona Boy"? Every blessed day of my life I use Rexona Shaving Soap, and not for worlds would I use any other. You can take it from me there is nothing like the Rexona Triangular Stick when you want to shave in a hurry in the morning. It lathers fine, and makes that beard of mine as soft as swan's down. That is saying a lot, so when I tell you there is nothing like Rexona Shaving Soap, I mean it. So here's good luck to Rexona.

The original "Rexona Boy"
(Sgd.) PHIL. SMITH.

Her Majesty's Theatre, Sydney, N.S.W.

Rexona Shaving Soap *The Triangular Stick*

Rexona Shaving Soap makes for comfort and hygiene in shaving, and tempers the skin against wind and bad weather.

It will be found the most economical Shaving Stick on the market, but care should be exercised not to dip the Stick in the water, but wet the face, and apply the Shaving Soap dry. A few applications with the shaving brush will quickly produce a thick, creamy lather, which lasts and thoroughly softens the beard, leaving the skin in a healthy and hygienic condition after the shave.

Everyone should use a Medicated Soap for Shaving, for after going over the face with the razor, and removing the beard, the skin needs a protection from the germs carried by the dust, which everyone has to face.

Rexona Shaving Soap is the highest standard of Shaving Soap that it is possible to produce, and a good Shaving Soap means everything to a shave, for, if the beard is properly lathered, a shave is a delight, but if the beard is not properly lathered, but is stiff and harsh, it is not only severe on the user, but hard on the razor.

Rexona—the Triangular Stick—1/6

Rexona

SHAVING STICK



State Produce Agency.

Auction Sales Daily
of

Fruit and Vegetables

Commission, $7\frac{1}{2}\%$.

Grain, Chaff, Millet, etc.

Commission, 5%.

*The Agency specialises in the sale of
Broom Millet—good prices obtainable.*

Prompt Returns. Highest Market
Rates assured.

QUALITY THE BEST.

Office, Turbot Street;

Telephone, Central 5997.

Storeman, Turbot Street;

Telephone, Central 5998.

Fruit, Egg, and Poultry Department;

Telephone, Central 6158.

Bag Department;

Telephone, Central 5998.



This Comfortable
CO-SHIRT

8/11 POST
FREE

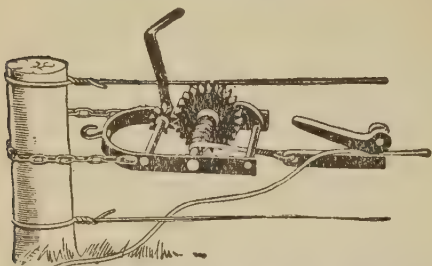
- Does away with wearing a coat, fitted with two pockets—turn down collar and rifle cuffs.
- Double stitched seams—to give the extra long life.
- Made in super Khaki Twill. *Price, 8/11.*

Mail Your Order To-day—Finney's Pay Carriage

Finney, Isles & Co. Ltd.

Queen and Adelaide Streets, Brisbane

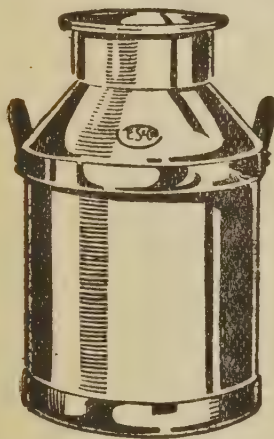
Things Every Farmer Should Have



THE "BURNETT" WIRE STRAINER 35/-

Carriage Extra

This is the best strainer yet. A boy can work it single handed. By simply turning a handle the wire can be strained to any desired tension. Grips heaviest barb or thinnest plain wire. No wire slipping; no post boring or plugging of holes. Order to-day and put your fences in order. Full directions supplied.



The Model "SAX" CREAM CAN

*Seamless and
Germproof*

All fittings are electrically welded. The lid is one-piece as is also neck and breast. This is the ideal Can—it lasts three times as long as other makes. Send for your requirements.

PRICES

2	3	4	5	6	8	10 galls.
24/-	26/-	30/-	36/-	38/-	42/6	45/-

Discounts for Quantities. Enquiries invited.

We also manufacture Seamless Milk Buckets and Strainers, Milk Vats, etc. Old Cream Cans and Separator parts re-lined and made equal to new.

E. Sachs & Co. Ltd.

Manufacturers & Distributors

78-80 Eagle Street, Brisbane

A FACT THAT EVERYONE SHOULD KNOW

As a rule, when a man gets something for nothing he fails to value it, but here's a valuable booklet which, on its sheer merit, is warranted to arouse the appreciation of all who procure it. This booklet deals very clearly with the various ailments stock are subject to. It enables anyone to diagnose a disease and apply a satisfactory and scientific remedy. The publication of this useful little work is due to the initiative and enterprise of Surgical Supplies Ltd., Brisbane. In addition, a few pages are devoted to useful information on surgical and veterinary instruments, stock and station knives, horse and cattle remedies, household cutlery, or sick-room requisites. This progressive firm are recognised as specialists in a multitude of things, not omitting cattle brands, ear pliers, tattoo forceps, and appliances for the deaf.

Surgical Supplies Ltd., in supplying such a number of human needs, deserve every appreciation. The skill put into the manufacture of many of their lines is a monument to Australian workmanship.

SURGICAL SUPPLIES LTD.

BRISBANE

Departmental Announcements

IT is hereby notified that the "Journal" will be supplied to all members of Agricultural and Horticultural Societies in Queensland who do not derive their livelihood solely from the land on payment, in advance, of an annual subscription of 5s., which will include postage. Queensland Schools of Arts will be supplied free of charge on the prepayment of 1s. per annum to cover postage. Persons resident in Queensland whose main source of income is from Agricultural, Pastoral, or Horticultural pursuits, which fact should be stated on the attached Order Form, will receive the "Journal" free

ON PREPAYMENT OF 1s. PER ANNUM to cover postage.

To all other persons the annual subscription will be 10s., which will include postage.

All remittances should be made by postal notes or money orders, but where they are unobtainable stamps will be accepted, though the Department accepts no responsibility for any loss due to the latter mode of remittance.

For your convenience an Order Form is attached. A cross on each side of the Order Form indicates to the recipient that his subscription is again due. Watch also the wrappers on the "Journal." The figures alongside the address serve as a receipt, and they also indicate when the subscription expires—thus, "9/17" means that subscription expires with the copy of the ninth (September) month in the year 1917.

Amount of one year's subscription should be forwarded with Order Form before the 15th of the month to the Under Secretary, Department of Agriculture and Stock, Brisbane.

All new subscriptions or renewals received for the "Journal" after the tenth day of the month will commence with the month after that on which the subscription is received. Previous copies available will be supplied at 6d. per copy to subscribers only. To all others 1s. per copy.

The Editor will be glad to receive any papers of special merit which may be read at meetings of Agricultural and Pastoral Associations in Queensland, reserving, however, the right to decide whether their value and importance will justify their publication.

ORDER FORM.

From

Name _____

Please
write
Plainly.

Postal Address _____

To the Under Secretary,

Department of Agriculture and Stock, Brisbane.

For the enclosed _____ please forward
me the "Queensland Agricultural Journal" for _____ year.

My main source of Income is from _____

State whether "renewal" }
or "new subscriber" }

NOTE.—Subscribers who wish to obtain the Journal for the month when the subscription is sent, must apply before the fifteenth of that month.



Secretaries of Associations are requested to be good enough to forward to the Editor, as early as possible, the dates of forthcoming Shows, as it is important in the interests of the Associations that these dates should be published. Changes in dates must also be promptly advised.

It is equally necessary that prompt notice be given to the Editor of changes in the Secretaryship of any Society or Association, a matter which is much neglected. Furthermore, information concerning dates on which Shows are to be held must be forwarded to the Editor at least six weeks before the Show date. If these suggestions are not complied with, the Society whose Secretary neglects to supply the required information will be liable to be struck off the list of Societies published in the "Journal."

To enable recipients of the "Queensland Agricultural Journal" to have the half-yearly volume bound, Covers in Boards and Cloth will be supplied from this Office on application to the Under Secretary for Agriculture. Applications must be accompanied by a remittance to cover cost. Covers will be supplied at **One Shilling and One Shilling and Ninepence** each.

In order to avoid disappointment, correspondents who wish for replies to questions in the "Journal" are requested to note that it is imperative that all matter for publication on the first day of any month should reach the Editor by the 15th of the previous month.

We would ask our Subscribers to note that, when their Subscription has run out, a **Cross** is placed against the Order Form. It often happens that this intimation is disregarded, with the result that the "**Journal**" is **not posted** to the Subscriber. The Department cannot guarantee to supply back numbers in such cases.

Pamphlets on different subjects relating to Agriculture, Horticulture, and Stock are issued by the Department, and may be obtained **gratis**, on application to the Under Secretary.

Farmers who wish to **Advertise** products, &c., in this "Journal" should address all inquiries in relation thereto to the Government Printer, Advertising Branch, Brisbane.



Xylonite Toilet Ware

OF SERVICE AND BEAUTY

is greatly in demand this Christmas at Cribb & Foote's very moderate prices for Presentation purposes.

Mail your Christmas Order
— to-day, to avoid delay —



A Xylonite Gift always pleases.

Mirrors—9/6, 12/6, 13/6, 18/6, 27/6, to 32/6

Clothes Brushes—9/6, 12/6, 18/6, to 28/6

Hat Brushes—9/6, 11/6

Cheap-Line Mirrors—2/6, 3/6, 3/6, to 6/6 ea.

Serviette Rings—1/6 and 1/3 each

Hair Brushes—15/6, 20/6, 27/6, to 45/6

Gent's Military Brushes—28/6, 38/6, 55/6

Combs—2/3, 4/6, 5/6, 5/6, to 9/6

Xylonite Trays—Small, 1/6, 2/6, 2/6, 3/6
Medium and Large, 7/6 to 38/6

Trinket Boxes—5/6, 9/6, 15/6, 18/6, to 55/6

Baby Sets—9/6 to 30/6

Clocks—45/6 to 55/6 each

Baby Brushes—3/6 and 4/6

Baby Combs—1/6 and 1/6 each

Annuals for Boys and Girls—

Boys' Own Annual—Every Boy
should read this year's

14/6
NETT

Girls' Own Annual—The Book
this year for Girls

14/6
NETT

Chums—The grand old Favourite 15/6 NETT

MAIL YOUR CHRISTMAS ORDER EARLY—TO-DAY!

Cribb & Foote,

Universal Providers by Mail IPSWICH.

Yeerongpilly Stock Experiment Station

Scale of Charges

Pure Lactic Culture in milk for cheese and butter starter ..	1/6
Bulgarian Lactic Culture (Metchnikoff)	2/6
Pleuro Virus (natural) guaranteed free from the taint of Tuberculosis and Septic Organisms	4/- per 50 animals
Double Blackleg Vaccine	4/- per 10 animals
Special Tuberculin	2/6 per 5 animals
Tested Blood for Tick Fever Inoculation	6d. per dose
(Minimum charge)	1/6
Bacteriological examination of milk for Tubercle Bacilli, and streptococci of Contagious Mammitis	2/6
Auto Vaccine for Contagious Mammitis	5/-
Agglutination test of blood for Contagious Abortion	2/6
Vaccine Cultures for Contagious Abortion	5/-
Microscopical examination of morbid specimens, tumours, etc. ..	2/6
Bacteriological examination of water (qualitative and quantitative) with recommendation as to suitability or otherwise for dairying and other purposes	5/-
Blood supply animals (bleeders). [These animals are tested for Tuberculosis, inoculated against Pleuro Pneumonia, vaccinated against Blackleg, and their blood is guaranteed to produce a reaction when injected into susceptible cattle.]	£10 per head
Stud cattle received and stalled for immunisation against Tick Fever—Single animals	3/- per day
Two or more animals	2/6 per day each

Full directions for use are supplied with the above Laboratory products

All Applications should be addressed to—

The Government Bacteriologist,
Stock Experiment Station, Yeerongpilly, near Brisbane

Advertise Your Goods.

Mr. Poultry Man! Why not advertise your goods in the Agricultural Journal? "Nothing Succeeds like Success," and it has been amply proven by the returns of those of our clients who advertise monthly in this Journal. It is the Medium of Success, which will be yours, should you follow the advice of—

The Government Printer
Advertising Branch
George Street, Brisbane
'Phone Central 5150

Government State Farms

Stud Notices, etc.

Kairi (N.Q.) Stock

Orders taken for supply, as available, of Six Months Old Jersey Pedigree Bull Calves, from high-class registered animals.

Warren (Q.C.R.) Stock

Orders taken for supply, as available, of Six Months Old Ayrshire Pedigree Bull Calves, from high-class registered animals.

PIGS:—Berkshires, Young Boars and Sows for Sale.

Applications to "THE MANAGER"

The Value of Lucerne Crops

Is largely dependent upon the yield. The poor crops which are so much in evidence can hardly be considered profitable and are indications that

Something is wanting in the Soil.

That this is so is only too apparent, and farmers would do well to consider the reason.

The Main Reason

For the poor stands of lucerne is that the soil does not contain sufficient available plant food for the production of a good crop, and this means that both yield and quality suffer.

Quantity and Quality

Not only may the yield be materially increased but also the quality and nutritive value of the fodder by applying

SHIRLEYS SPECIAL LUCERNE FERTILIZERS

“Be Sure You Get Shirleys”

Give those old worn-out paddocks a top dressing, the result will surprise you.

Shirleys Fertilizers Proprietary Ltd.

Parbury House, 127 Eagle Street, Brisbane

QUEENSLAND CROWN LANDS.

Upper Burnett and Callide Valley Districts

Areas for Fruit, Maize, Lucerne,
Cotton Growing, Dairying, and
General Farming.

3,000,000 Acres.

Rainfall, 28 to 30 inches Yearly.

Climate temperate and equable.

Close proximity to ports and
markets.

EXTENSIVE areas of rich brigalow and vine scrub, well grassed slopes, ridges, extensive creek flats; areas of good open undulating country; easy granite slopes.

Rich brown and chocolate volcanic soils; alluvial flats with soil deposits of good depth, well adapted to almost every kind of crop, excellent lucerne and cotton land, potatoes, maize, sorghum, cereals, or mixed farming. The district is splendid dairying, breeding, and fattening country.

Permanently watered by creeks, lagoons, and waterholes. Good supplies also obtainable at shallow depths in the beds of other watercourses. Well water at depths from 55 feet.

Whole area classified by Staff Surveyors, who are now subdividing into suitable selections from 100 acres upwards. Railways being constructed from Mundubbera, Many Peaks, and Rannes, to connect with ports of Maryborough, Gladstone, and Rockhampton. Roads to be formed giving access to the railways. Experimental plots established to demonstrate growing of cotton and other crops.

Land will be available for Selection before the end of 1923.

ALSO

Clermont and Capella Cotton Lands

Adjacent to Emerald—Blair Athol
Railway.

Cotton successfully grown in these
Districts for Several Years.

300,000 Acres for Selection.

To be made available as Cotton
and Mixed Sheep and Dairy
Farms from 320 Acres upwards.

AREAS of open black soil downs ready for the plough, open forest ridges, lightly timbered, patches of brigalow with good soil. Water at 40 feet generally in some places at shallower depths.

TERMS OF SELECTION FOR ABOVE:

Perpetual Leases on liberal terms; annual rent, $1\frac{1}{2}$ per cent. of capital value, second year rent free. Improvements.—Selection to be fenced, or other improvements equal to cost of enclosing fence, within five years. Survey fee payable in five yearly instalments without interest.

Advances by State Advances Corporation for term of twenty-five years up to £1,200 for clearing and improving, purchasing stock, implements, &c., at 15s. in the £1 on security value of land and improvements effected or proposed. Special advances in full value for effecting certain improvements and purchasing stock. First five years, simple interest only at 5 per cent., then interest and redemption at the rate of £4 0s. 3d. half-yearly for each £100 borrowed.

Applications are invited from persons who are desirous of selecting. Applicants must furnish particulars as to age, experience and where obtained, number in family, and resources. Names will be registered in the Land Settlement Inquiry Section of Lands Department, and applicants will be supplied with fuller particulars and plans when the opening has been further advanced.

These Districts offer Unsurpassed Opportunities for Intending Settlers.

For Further Particulars, apply to

The Land Settlement Inquiry Section, Lands Department, Brisbane.



Mail your order to Pigott's—avoid the tragedy of the empty stocking Christmas morning

Pigott's deliver your Christmas Order two days ahead of Brisbane

Mail your order to Pigott's for Xmas Hampers of Toys. Prices from 7/6, 10/6, 12/6, 15/-, 17/6, 20/-, 25/- to £5.

YOU CAN ORDER IN ANY QUANTITIES

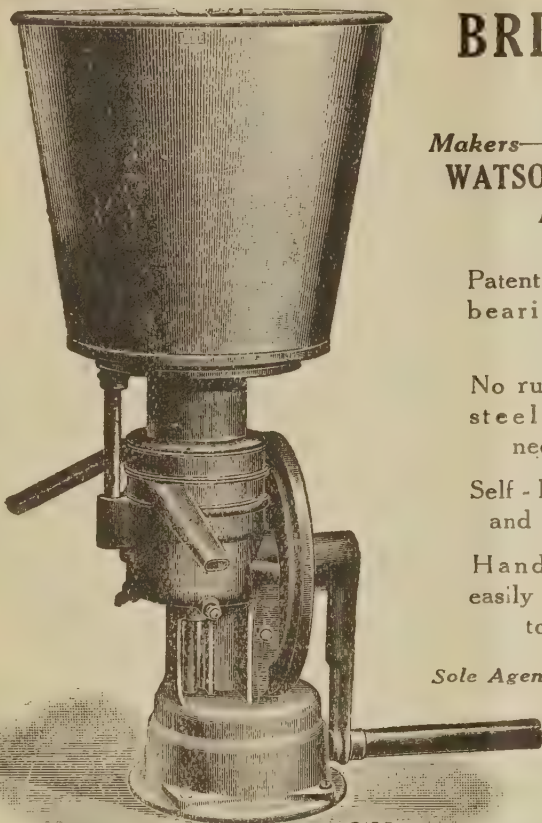
Every year we receive many orders from Firms, Sunday Schools, Kindergartens, for big supplies of Toys in quantities. You can order like this too, if necessary. Just send the money and say, "Make up a parcel valued at....., including Toys at....." (naming the prices you wish to pay). State how many children the Toys are for, their ages, and if boys or girls. We make a splendid varied collection, and utmost satisfaction is guaranteed, both as to quality and variety.

SEND AN ORDER EARLY

PIGOTT & CO. LTD.

Best Value Stores

Toowoomba and Warwick



BRITISH PRINCESS SEPARATOR

Makers—

WATSON, LAIDLAW & CO., GLASGOW

New and Wonderful Design

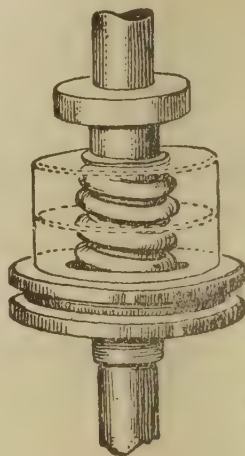
Patent spiral neck
bearing of Gun-
metal.

No rubber rings or
steel springs in
neck brush.

Self-lubricating
and everlasting.

Hand Princess
easily converted
to power.

Sole Agents—



W. A. PRESTON & CO.

Dairy Machinery Merchants

175-179 Albert St., BRISBANE

Please Look at This!

Breeding Pens For Sale

Six White Leghorn Hens
and unrelated Rooster,
£2 10s.

Six Black Orpington Hens
and unrelated Rooster,
£3 3s.

*Settings 10/6 each or
Three for £1. Freight
Paid to nearest Rail-
way Station.*

**Passchendaele Poultry
Farm**

Beerwah, North Coast Line, Q.

White Leghorns

Winner of
Gatton College Competitions
1916-17, with 1,542 eggs;
1919-20, with 1,596 eggs.

Winner of Single Hen Test, Gatton
College, 1918.

Winner Birkdale Competition, 1918.

Winner of Winter Test, Gatton
College, 1919.

Now Booking Pullets for prompt
delivery at £2 2s. per bird. Hens,
eighteen months old, a good lot—
one guinea each. White Leghorn
Settings (15 eggs), £2 2s. and
£1 1s. Satisfaction guaranteed.
Forwarded by rail or steamer.

*When buying get the best.
Correspondence Invited.*

J. M. MANSON
YERONGA, BRISBANE

MALTHOID

Roofing and Floor Covering

MALTHOID is the best roofing for your dwelling and all outhouses, including milking sheds, cream sheds, stables, etc. It is marvellously enduring, defies wind, storm, rain, or sun. As a floor covering, MALTHOID will outlast the best linoleum. Send for actual samples, and printed matter.

NEW ZEALAND LOAN & M.A. COY. LTD.

Eagle Street, Brisbane

HENRY DEAN & SONS LTD.

ROMA STREET, BRISBANE

The best place for your farm seeds, also horse feed.

☐ Consign your produce for Sale—for highest prices and quick returns.

Queensland Agricultural College.

The College is situated in the centre of the Lockyer Valley, 4 miles from the town of Gatton, and 1 mile from College Siding. It has accommodation for 60 Students.

The Syllabus provides for—

1. A three years' course in General Agriculture and Animal Husbandry, leading to the Agricultural Diploma.
2. A two years' course specially designed to qualify Students for Dairy Factory Management, and leading to the Dairy Diploma.
3. Short courses of from six to twelve months in various sections of the farm, and suitable for those not qualified to take either of the Diploma courses.

FEEES.

Board and tuition for any course £27 per annum, payable half-yearly in advance. A Guarantee deposit of £2 must be paid on entering the College and annually thereafter; 10s. each for Medical and Sports fees respectively are payable each half-year.

Full details and application forms may be had from the Under Secretary, Department of Agriculture, Brisbane, or the Principal of the College.

Age of Entry.

Candidates must not be less than sixteen years of age.

Bursaries.

An examination will be held in November next, in Brisbane and elsewhere, according to where the candidates reside, for four Bursaries at the Queensland Agricultural College, tenable for three years. Candidates must not be less than sixteen or more than eighteen years of age on 1st January, 1922.

Full particulars and conditions on application to

The Under Secretary,

Department of Agriculture and Stock, Brisbane.

Tobacco Seed for Disposal

The DEPARTMENT OF AGRICULTURE is in receipt of fresh supplies of Tobacco Seed from U.S.A., and is able to supply limited quantities of the following varieties at 3/6 per oz., postage free to any part of Queensland.

Connecticut Havana

A Cigar Tobacco grown for wrappers and binders, and also to some extent for filler purposes.

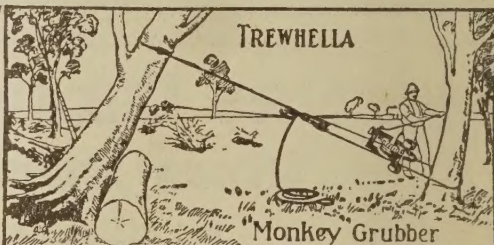
Cuban (Connecticut grown)

Also a Cigar Tobacco, but chiefly grown for filler purposes.

STUMP GRUBBING

Does not now mean a lot of hard back-breaking work with pick, shovel, and axe. It means just a few minutes with the

Trewhella Monkey Grubber



and you have the stump or tree right out, roots intact. The machine is light, portable, powerful, simple, and easy to rig and operate. Can be worked anywhere in any position. Two men can carry it comfortably, and it is built for hard rough usage.

British Material.—Think what this means to you, then act.—**British Workmanship**

WHAT IS YOUR
ADDRESS, PLEASE?

A. ROBINSON, 549 Queen Street, Brisbane

DEPARTMENT OF LABOUR

(CONTROLLED BY THE STATE GOVERNMENT).

NO CHARGES—NO FEE.

Central Labour Exchanges have been established at Cairns, Townsville, Rockhampton, Bundaberg, Brisbane, Ipswich, and Toowoomba.

Employers who are in need of Labour, and Employees who are looking for work, may have the services of the "Free Exchanges" by using the Letter Cards supplied without charge at all Post Offices, or otherwise communicating their needs to the nearest Exchange.

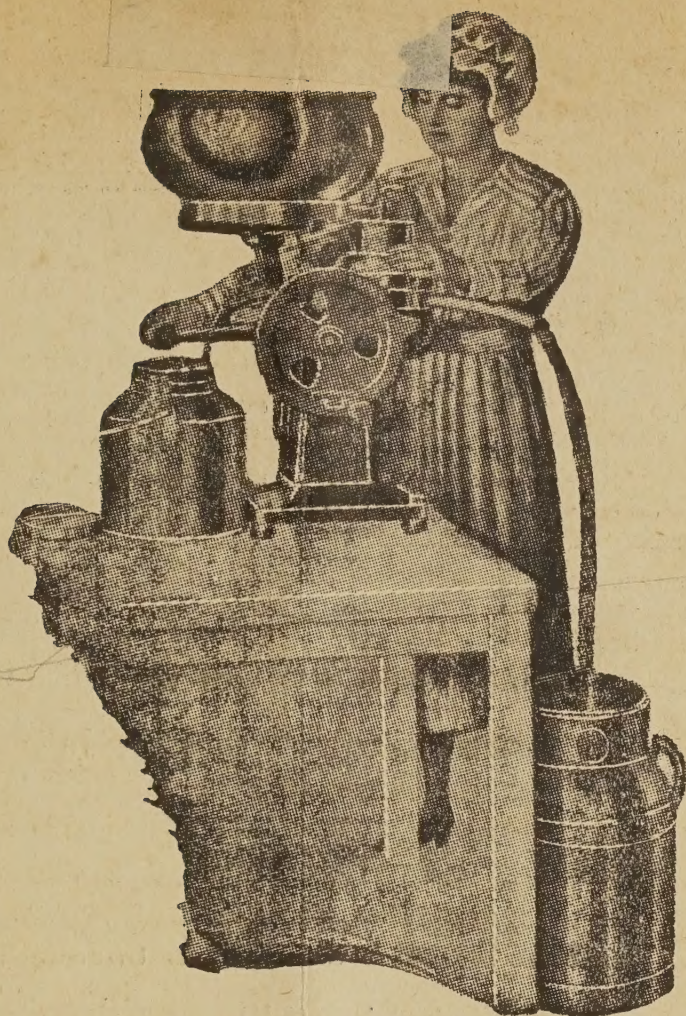
WOMEN WORKERS.

An Employment Agency for all classes of Women Workers is conducted at The Labour Dept., Edward St., Brisbane. The Agency has for its purpose the better organisation of the Market for Women's Work. Employers are invited to call, write, or wire the Manageress, who will give immediate attention to all applications and inquiries. Women Workers desiring employment of any kind are invited to enrol their names at the Agency.

NO CHARGE IS MADE FOR THE SERVICES OF THE AGENCY.

The Agency deals with all classes of occupations for Women, including Home Work, Educational Work, and Employment in private houses, Offices, Shops, Hotels, Restaurants, Workrooms, and Factories.

F. E. WALSH, Director of Labour.



A WEARISOME BELL

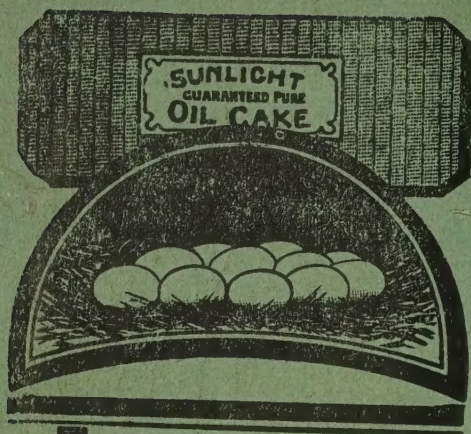
The same bell continually tolling gets wearisome to the ear, similarly a change of message may be refreshing to you. We will change the peal and let another tell the message—

"I have pleasure in stating that I have been using a Baltic Separator for eighteen years, and have received every satisfaction from the machine. As evidence of my appreciation of the high quality of the "BAL TIC," I ordered a larger machine, and after using the new Machine, I am very pleased with it and like all the improved features. I can honestly recommend the "BAL TIC" to all dairymen as a high-class Machine, and a superior skimmer."

W. LANDERS, Gowrie Junction.

A "BAL TIC" is most profitable by far !

Baltic Separator Co. Ltd.
18c Roma Street, Brisbane



MORE EGGS!

SUNLIGHT OIL CAKE is rich in Albuminoids and low in Moisture.

The general cause of shortage in eggs is either too high feeding or too low. For laying hens, Sunlight Oil Cake will quickly give a return which will astonish the owner. For chickens at any time after the age of 6 weeks it is unequalled.

Sunlight Oil Cake will impart the glossy sheen to the birds' appearance so prized by the fancier, and is specially valuable for this reason alone to all exhibitors of show poultry. It puts on solid flesh in an extremely short space of time, and experiments have proved that young, scraggy birds fed almost entirely on it have become covered with good plump meat in a few weeks, thus doubling their value to the market poulterer.

*A 32-Page Booklet—"Poultry Profits"—
sent free on application to—*

*Lever Brothers Limited,
Sydney.*



4533

40